SONY

COMPACT PLAYER

J-1/901, J-1/902
J-2/901, J-2/902
J-3/901, J-3/902

BETACAM
BETACAM SP
BETACAM SX
mpeg IMX
Digital BETACAM™

MAINTENANCE MANUAL
Volume 1 1st Edition (Revised 1)
Serial No. 10001 and Higher

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

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Manual Structure

Purpose of this manual

This manual is the Maintenance manual volume 1 of J-Series Compact player.

This manual is intended for use by trained system and service engineers, and describes periodic inspection and maintenance, diagnosis, the main part replacements, electrical alignment, circuit description, etc.

Related manuals

Besides this Maintenance manual volume 1, the following manuals are available for this unit.

- **Operation Manual CD-ROM (Supplied with this unit)**
  This manual is necessary for application and operation of Compact player J series.
  Part number: 3-205-378-XX

- **Operation Guide (Supplied with this unit)**
  This guide serves as a quick reference.
  Part number: 3-205-377-XX

- **e-Manual (Tentative name) (Available on request)**
  This electronic manual intended for use by trained system and service engineers describes (detailed parts list, block diagrams, schematic diagrams, and board layouts.) required for parts-level service.
  For obtaining, contact your local Sony Sales Office/Service Center.

- **“Semiconductor Pin Assignments” CD-ROM (Available on request)**
  This “Semiconductor Pin Assignments” CD-ROM allows you to search for semiconductors used in this unit.
  Semiconductors that cannot be searched for on this CD-ROM are listed in the maintenance manual volume 2 for the corresponding unit. This manual contains a complete list of all semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-XX

Contents

The following is a summary of the section of this manual.

Section 1 Service Overview
Describes fundamental area of the information that is required to service, (removal of cabinet and cassette compartment, the functions of printed circuit board, the locations of main part, fixture and measuring equipment information, notes, etc.), the measures against trouble.

Section 2 Error Message
Describes the error message.

Section 3 Maintenance Mode
Describes each menu of the maintenance mode.

Section 4 Periodic Inspection and Maintenance
Describes the recommended periodic maintenance, the cleaning procedure and the video head tip protrusion check procedure.

Section 5 Replacement of Main Parts
Describes the replacement of mechanical parts, power supply unit, and circuit boards.

Section 6 Tape Running System Adjustment
Describes the tape path alignment after replacement of parts that are described in Section 5.

Section 7 Electrical Alignment After Replacement of Main Parts
Describes the electrical alignment associated with replacement of parts that are described in Section 5.

Section 8 Electrical Alignment
Describes the electrical alignment for the maintenance of this unit.

Section 9 Circuit Outline
Describes the circuit description and the overall block diagram.

Appendix A Setting Check Sheet
The sheet is used for checking the setup conditions such as switch, setup menu under the application.

Trademark

Trademark used in this manual is as follows:

- Dolby is registered trademark of Dolby Laboratories Licensing Corporation.

Section 1
Service Overview

1-1. Power Supply

1-1-1. Power Supply Specifications

The switching regulator is used as the power supply of this unit.

Note

Be sure to use the unit within the range of the power supply voltage as described below.

Power voltage : 100 to 200 V AC ±10%
Power frequency : 50 Hz or 60 Hz
Power consumption : 50 W at maximum
Rush current : 30 A at 100 V
90 A at 240 V

Note

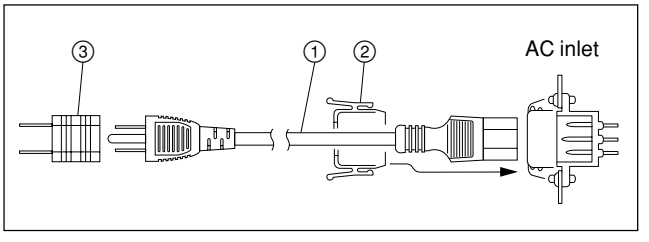
The AC power source must have the sufficient capacity that can withstand the rush current.
If capacity of the AC power source is not large enough, the circuit breaker of the AC power supply side will be activated or the unit may not work correctly.

1-1-2. Power Cord

WARNING

The power cord is not supplied with this unit. Be sure to use the specified power cord.
Do not use the damaged power cord.

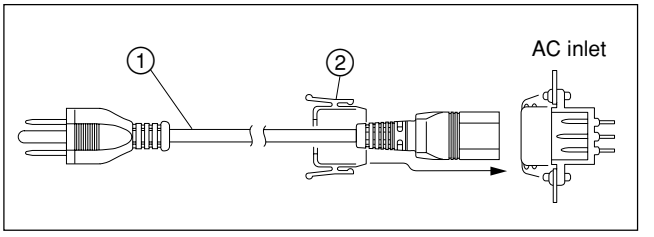
For Japan
Specified power cord : DK-2401 (J) or equivalent
① Power cord set (Approx. 2.4 m)
② Plug holder (brown) 3-613-640-01
③ Conversion adapter 3P-2P ⚠ 1-793-461-11



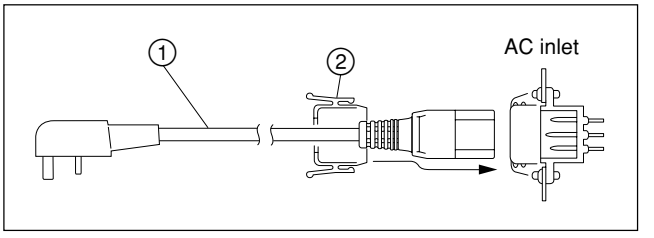
CAUTION

To avoid an electric shock, be sure to connect the ground to earth when the conversion adapter 3P-2P specified in No. 3 of the above illustration, is used.

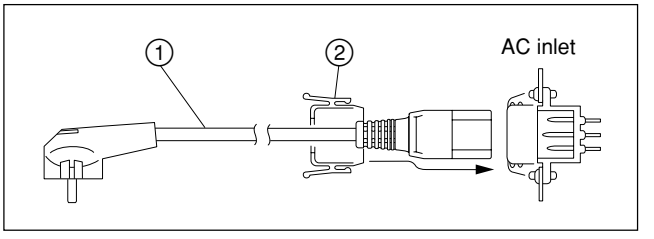
For U.S.A. and Canada
① Power cord 125 V 10 A (2.4 m) : ⚠ 1-557-377-11
② Plug holder (brown) : 3-613-640-01



For United Kingdom
① Power cord 250 V 10 A (2.4 m) : ⚠ 1-782-165-11
② Plug holder (brown) : 3-613-640-01



For European Continent
① Power cord 250 V 10 A (2.0 m) : ⚠ 1-551-631-22
② Plug holder (brown) : 3-613-640-01



When used in area other than above-mentioned or the type of the AC outlet is different, contact your local Sony Sales Office/Service Center.

1-1-3. Caution on Power Supply Block

Primary circuit/caution on electric shock

WARNING

The primary circuit of this unit consists of AC inlet, power switch, and power supply unit.
When performing service or maintenance with the main power being turned on, be careful not to receive the electrical shock.
Even if the POWER switch is turned off, the primary voltage is kept applied to the AC inlet and the POWER switch. Therefore, when the maintenance or repair work does not need the main power turned on, turn "OFF" the POWER switch and disconnect the power cord from the AC inlet (or outlet).

1-2. Cleaning When the Heads Are Clogged

When the video heads are clogged, clean the heads using the cleaning cassette tape (specified tape: BCT-HD12CL). For cleaning procedure, refer to "4-2-1. Cleaning Method using Cleaning Tape".

Note

Perform the cleaning using the specified cleaning cassette tape in the specified manner.
Otherwise, the video heads may be worn out excessively or damaged.

If head clogging cannot be removed even though the cleaning cassette tape is used, use a cleaning cloth.
For the cleaning using a cleaning cloth, be sure to read the notes and preparation in "4-2-2. General Information for Cleaning with Cleaning Cloth". And then, perform the cleaning, following the procedure in "4-2-3. Cleaning of Upper Drum Tape Running Surface and Video Head".

Note

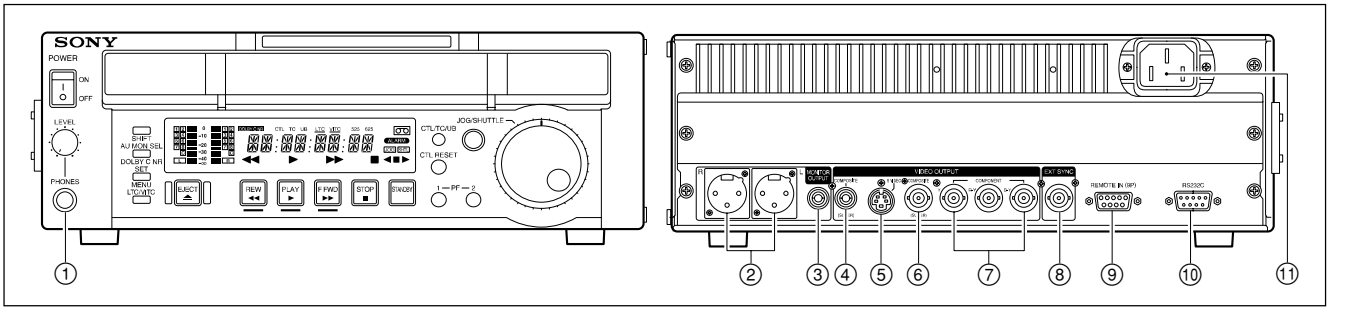
The cleaning cassette tape BCT-HD12CL is for HDCAM but can also be used for this unit.

1-3. Connector

1-3-1. Matching Connectors and Cables

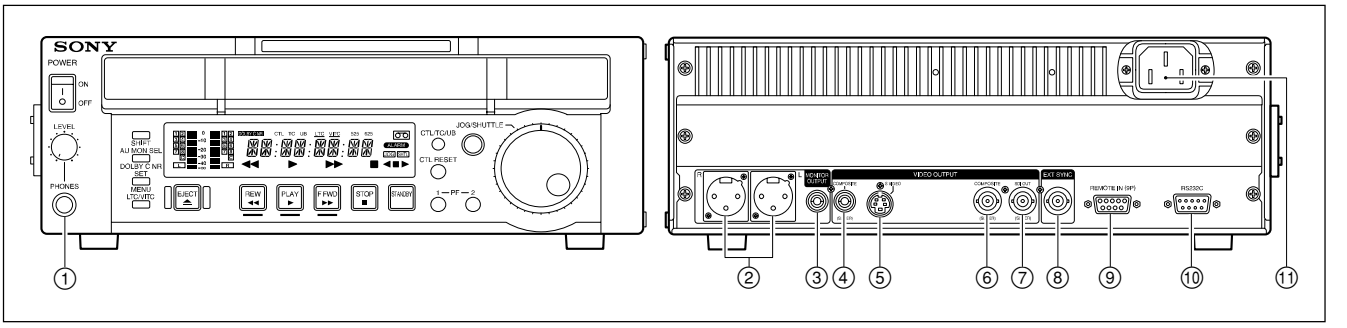
When connecting cables to the connectors of this unit, use the following connectors (or cables) or their equivalents.

J-1/901, J-2/901, and J-3/901



		Specifications	Matching connector	Part No.
①	PHONES	JM-60 stereo phone jack × 1 Analog Audio −∞ to −12 dBu (8 Ω loaded), unbalanced	JM-60 stereo phone plug	–
②	MONITOR OUTPUT	XLR 3P (male) × 2 (1 set : L and R) Analog Audio +4 dBm (Standard) (600 Ω loaded), Low Impedance, balanced	XLR 3P, FEMALE	1-508-084-00
③	MONITOR OUTPUT	Phono jack × 1 Analog Audio (L + R) −10 dBu (−20 dB FS, 1-channel playback), 47 kΩ loaded, unbalanced	Phono plug audio cable (commercially available on market)	–
④	VIDEO OUTPUT COMPOSITE (SUPER)	Phono jack × 1 (Character superimpose possible) Analog Composite Video 1.0 V p-p, 75 Ω, negative SYNC	Phono plug video cable (commercially available on market)	–
⑤	VIDEO OUTPUT S VIDEO	Mini DIN 4P (female) × 1 S Video Y : 1.0 V p-p, 75 Ω, negative SYNC C : 0.286 V p-p, 75 Ω	Mini DIN 4P plug video cable (commercially available on market)	–
⑥	VIDEO OUTPUT COMPOSITE (SUPER)	BNC × 1 (Character superimpose possible) Analog Composite Video 1.0 V p-p, 75 Ω, negative SYNC	BNC 75 Ω, MALE	1-569-370-12
⑦	VIDEO OUTPUT COMPONENT	BNC × 3 (1 set : Y, R-Y, and B-Y) Analog Component Video Y : 1.0 V p-p, 75 Ω, negative SYNC R-Y/B-Y : 0.757 V p-p (525 mode), 75 Ω R-Y/B-Y : 0.525 V p-p (625 mode), 75 Ω	BNC 75 Ω, MALE	1-569-370-12
⑧	EXT SYNC	BNC × 1 (Frame lock only) 1.0 V p-p, 75 Ω	BNC 75 Ω, MALE	1-569-370-12
⑨	REMOTE IN (9P)	D-SUB 9P, FEMALE RS-422A Interface, For Sony 9-pin remote control unit	9P remote control cable (RCC-G series) or D-SUB 9P, MALE and JUNCTION SHELL 9P	– 1-560-651-00 1-561-749-00
⑩	RS232C	D-SUB 9P, MALE For Sony 9-pin remote control unit	D-SUB 9P, FEMALE	1-563-815-21
⑪	AC INLET	100 to 240 V AC ±10 %	Refer to Section 1-1-2.	

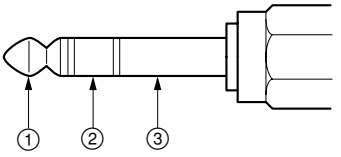
J-1/902, J-2/902, and J-3/902



		Specifications	Mating connector	Part No.
①	PHONES	JM-60 stereo phone jack × 1 Analog Audio −∞ to −12 dBu (8 Ω loaded), unbalanced	JM-60 stereo phone plug	–
②	MONITOR OUTPUT	XLR 3P (male) × 2 (1 set : L and R) Analog Audio +4 dBm (Standard) (600 Ω loaded), Low Impedance, balanced	XLR 3P, FEMALE	1-508-084-00
③	MONITOR OUTPUT	Phono jack × 1 Analog Audio (L + R) −10 dBu (−20 dB FS, 1-channel playback), At 47 kΩ loaded, unbalanced	Phono plug audio cable (commercially available on market)	–
④	VIDEO OUTPUT COMPOSITE (SUPER)	Phono jack × 1 (Character superimpose possible) Analog Composite Video 1.0 V p-p, 75 Ω, negative SYNC	Phono plug video cable (commercially available on market)	–
⑤	VIDEO OUTPUT S VIDEO	Mini DIN 4P (female) × 1 S Video Y : 1.0 V p-p, 75 Ω, negative SYNC C : 0.286 V p-p, 75 Ω	Mini DIN 4P plug video cable (commercially available on market)	–
⑥	VIDEO OUTPUT COMPOSITE (SUPER)	BNC × 1 (Character superimpose possible) Analog Composite Video 1.0 V p-p, 75 Ω, negative SYNC	BNC 75 Ω, MALE	1-569-370-12
⑦	VIDEO OUTPUT SDI OUT (SUPER)	BNC × 1 (Character superimpose possible) Serial Digital Interface (270 M bit/sec) SMPTE 292M conformed	BNC 75 Ω, MALE	1-569-370-12
⑧	EXT SYNC	BNC × 1 (Frame lock only) 1.0 V p-p, 75 Ω	BNC 75 Ω, MALE	1-569-370-12
⑨	REMOTE IN (9P)	D-SUB 9P, FEMALE RS-422A Interface, For Sony 9-pin remote control unit	9P remote control cable (RCC-G series) or D-SUB 9P, MALE and JUNCTION SHELL 9P	– 1-560-651-00 1-561-749-00
⑩	RS232C	D-SUB 9P, MALE For Sony 9-pin remote control unit	D-SUB 9P, FEMALE	1-563-815-21
⑪	AC INLET	100 to 240 V AC ±10 %	Refer to Section 1-1-2.	

1-3-2. Pin Assignment of Connector

① **PHONES** : JM-60 stereo phone jack

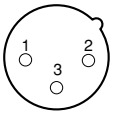


Note

This illustration shows the plug of insertion side.

Pin No.	Signal
1	Audio L
2	Audio R
3	GND

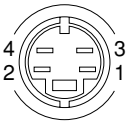
② **AUDIO MONITOR OUTPUT** : XLR-3 pin (male)



–EXT VIEW–

Pin No.	Signal
1	GND
2	X
3	Y

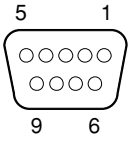
⑤ **S VIDEO** : DIN Mini 4 pin (female)



–EXT VIEW–

Pin No.	Signal
1	A GND
2	A GND
3	Y
4	C

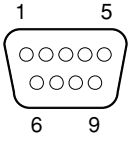
⑨ **REMOTE IN (9P)** : 9 pin (female)



–EXT VIEW–

Pin No.	Signal
1	GND
2	RM TX (–)
3	RM RX (+)
4	GND
5	PRIORITY
6	GND
7	RM TX (+)
8	RM RX (–)
9	GND

⑩ **RS232C** : 9 pin (male)



–EXT VIEW–

Pin No.	Signal
1	DCD ; Data Carrier Detect (Input)
2	RXD ; Received Data (Input)
3	TXD ; Transmitted Data (Output)
4	DTR ; Data Terminal Ready (Output)
5	SG ; Signal Ground
6	DSR ; Data Set Ready (Input)
7	RTS ; Request to Send (Output)
8	CTS ; Clear to Send (Input)
9	NC

1-4. Removing and Installing the Cabinet

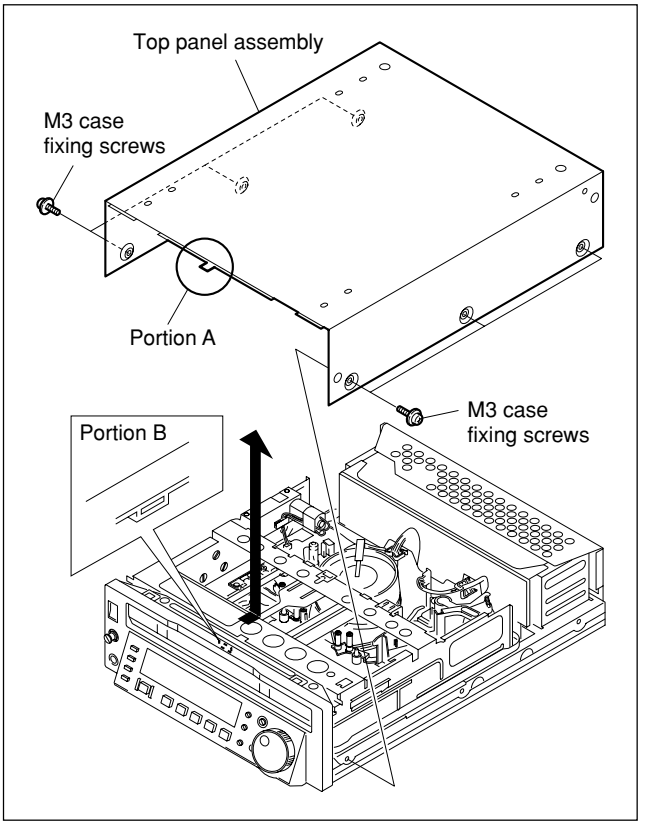
Note

Before starting the operation, be sure to turn off the main power and disconnect the power cord from the AC inlet.

1-4-1. Top Panel Assembly

Removal Procedure

1. Remove the six M3 case fixing screws.
2. Remove the top panel assembly in the direction of the arrow.



Installation Procedure

Install the top panel assembly by reversing the steps of removal.

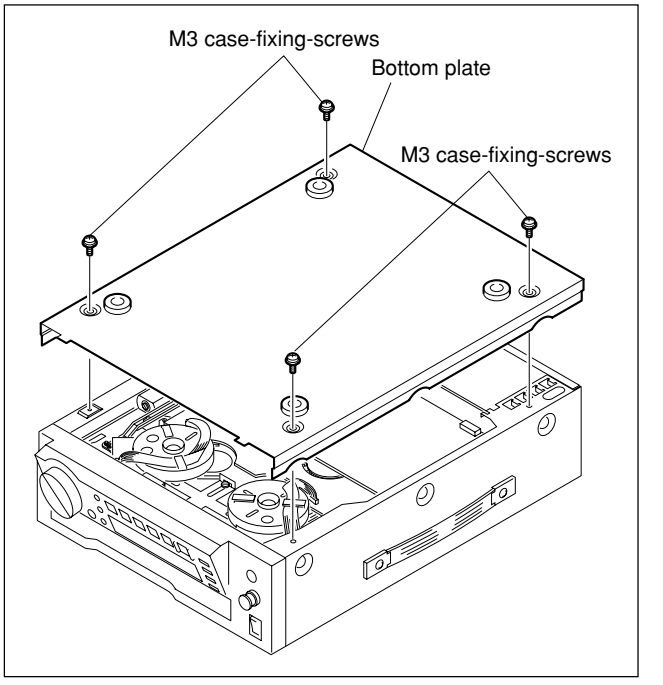
Note

Insert firmly the portion A of the top panel assembly into the hole (portion B) of the front panel.

1-4-2. Bottom Plate Assembly

Remove Procedure

1. Remove the four M3 case-fixing-screws.
2. Remove the bottom plate assembly.



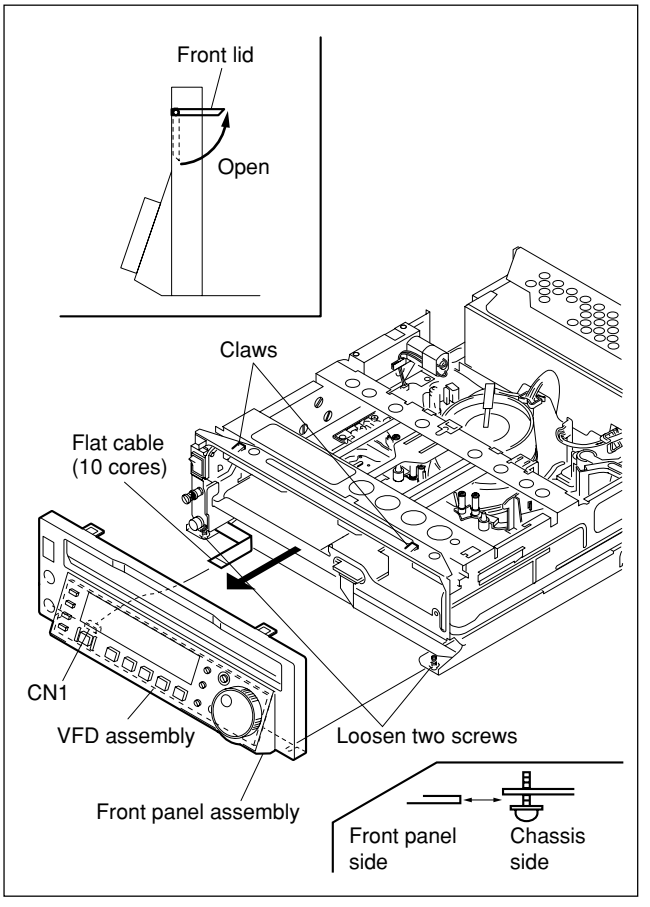
Installation Procedure

Install the bottom plate assembly by reversing the steps of removal.

1-4-3. Front Panel Assembly

Removal Procedure

1. Loosen the two screws on the lower side of the front panel assembly.
2. Release the front panel assembly from the two claws on the upper side. While the front lid is kept open, remove the front panel assembly in the direction of the arrow.
3. Disconnect the flat cable (10 cores) from the connector (CN1) of the VFD assembly.



Installation Procedure

Install the front panel assembly by reversing the steps of removal.
(Perform the installation under condition that the front lid is kept open.)

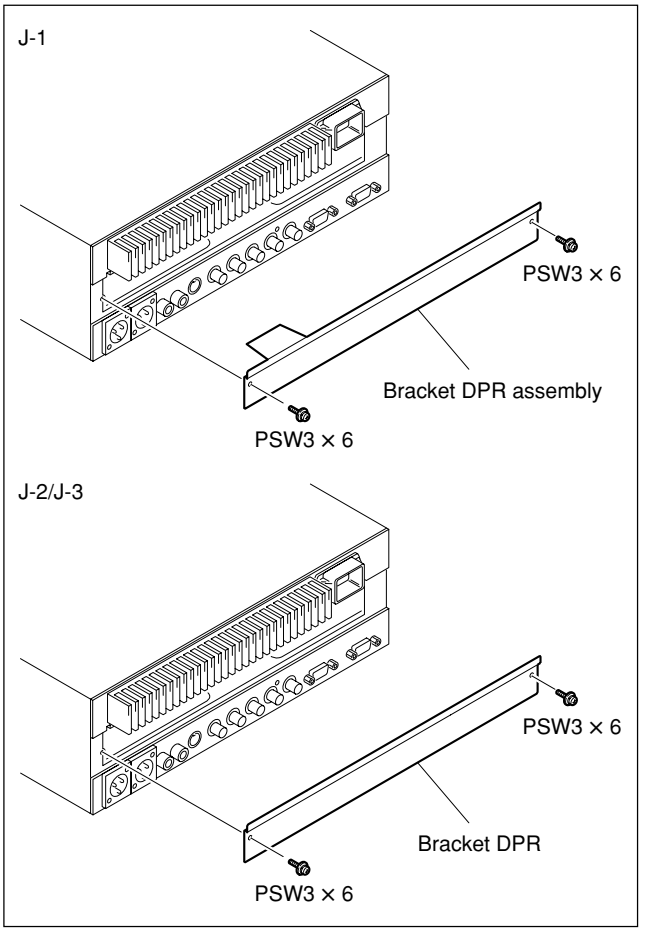
Note

Check that the two screws in the right and left are loosened enough to create the clearance that the lower side of the front panel assembly can be inserted.

1-4-4. Bracket DPR Assembly (J-1)/ Bracket DPR (J-2/J-3)

Removal Procedure

1. Remove the two screws.
2. Remove the bracket DPR assembly.



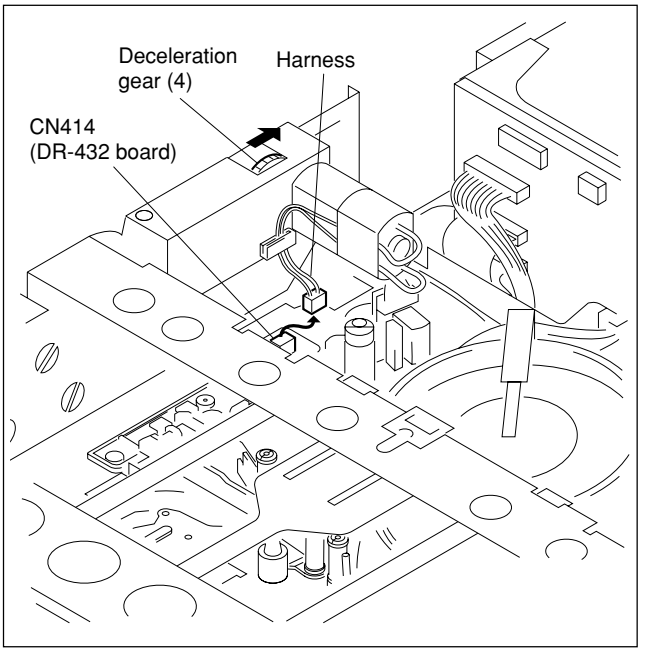
Installation Procedure

Install the bracket DPR assembly by reversing the steps of removal.

1-5. Removing and Installing the Cassette Compartment

Removal Procedure

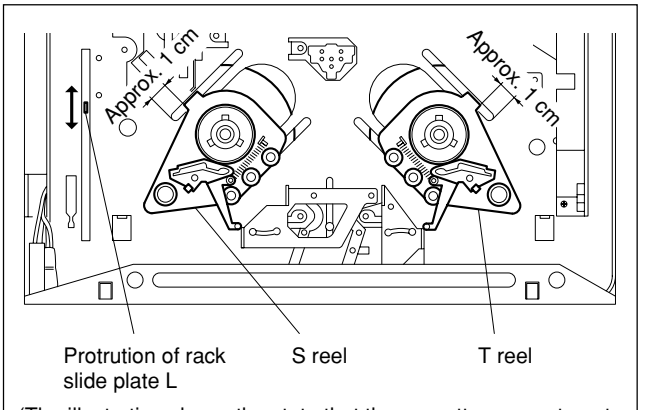
1. Rotate the deceleration gear (4) fully in the direction of the arrow and confirm that the cassette compartment stage is in the EJECT position (the position after the cassette eject is completed).
2. Disconnect the harness from the connector (CN414) on the DR-432 board.



3. Adjust by moving back and forth the protrusion of the rack slide plate L so that the S and T reels are positioned as shown in Figure.

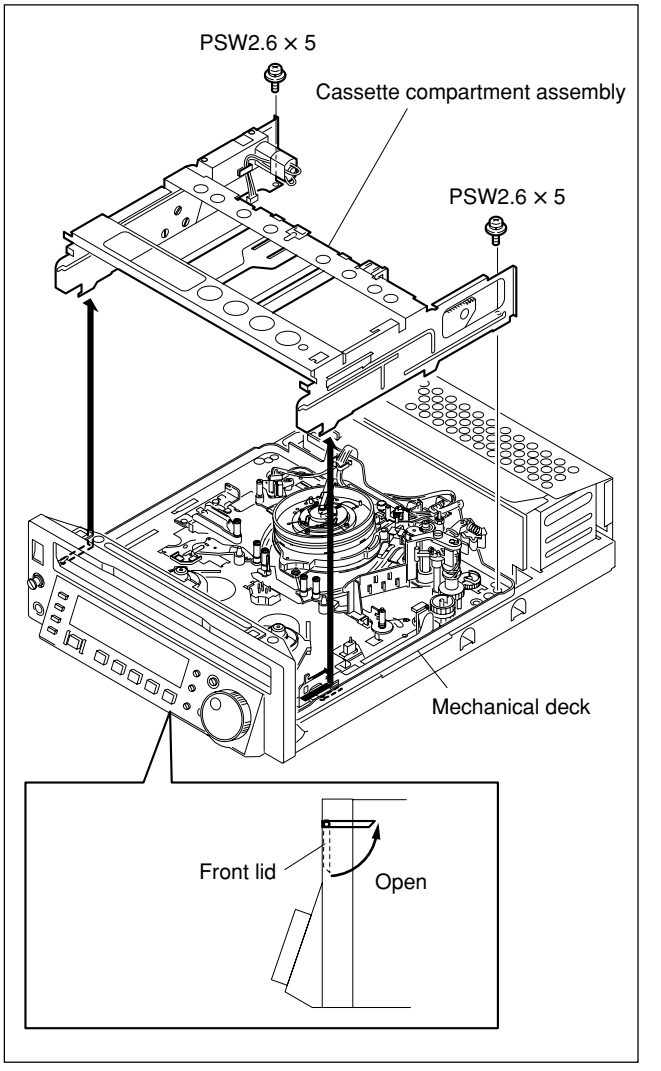
Note

The rack slide plate L can be moved with the cassette compartment installed.



(The illustration shows the state that the cassette compartment is already removed.)

4. Remove the two screws.
5. While the front lid is kept open, slide the cassette compartment assembly backward by 7 mm and remove it in the direction of the arrow.



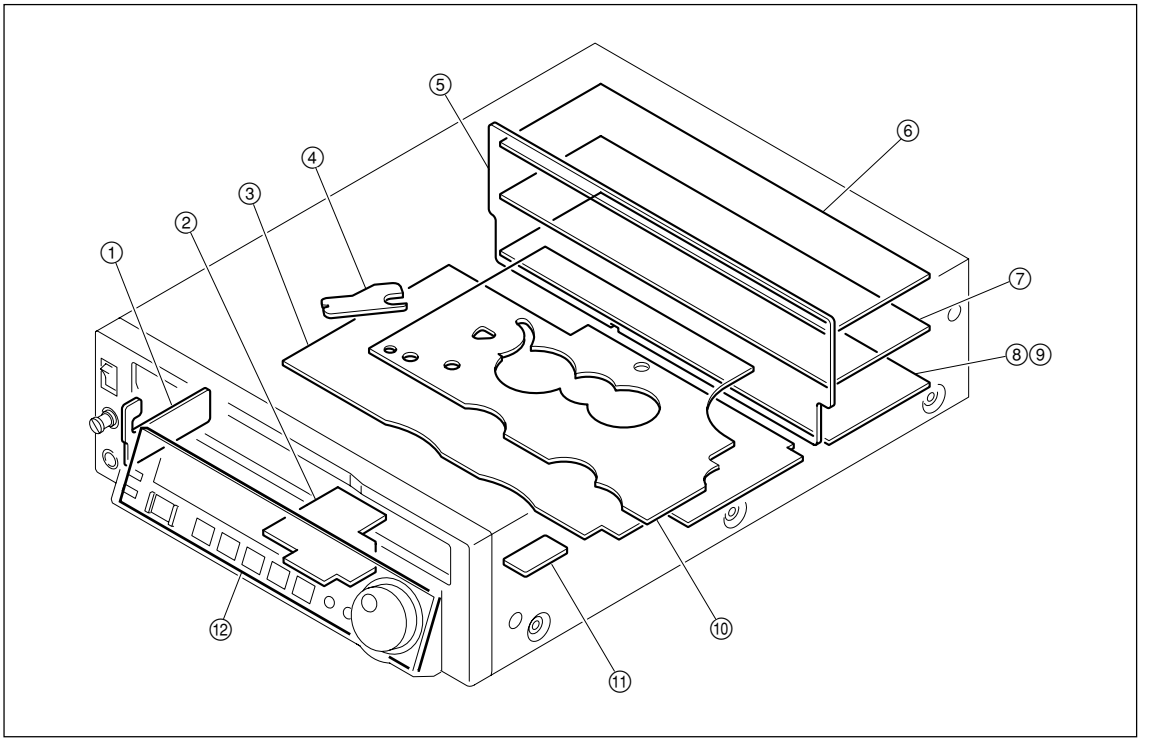
Installation Procedure

Perform steps 1 and 3 of the removal procedure, then install the cassette compartment assembly by reversing the steps 2, 4, and 5.

Note

After installing the cassette compartment, insert the S cassette and the L cassette alternately to confirm that the cassette insertion and ejection operations are performed correctly.

1-6. Circuit Configuration



No.	Board name		Circuit function
②	CCM-48		Loop antenna, Tele-File interface
③	DM-124		Analog BETACAM video PB (RF demodulator, TBC)
⑦	DPR-172 DPR-174	J-1 J-2/J-3	Decoder (digital PB) processor (Outer ECC decoder, Bit reduction decoder)
⑩	DR-432		Motor drivers (Drum, Capstan, Reels, Threading, Cassette compartment), Sensors (Dew, Tape top/end, Function cams), Brake solenoid driver, CTL/TC PB
①	HP-107		Head phone connector/volume (PHONES)
⑧	IF-808	J-1/901 J-2/901 J-3/901	Video encoder (Analog composite/component video, S VIDEO), Audio D/A converter, Analog BETACAM audio (LAU) PB, Interface/connector board (Analog composite/component video, S VIDEO, Audio monitor, Remote control connectors)
⑨	IF-826	J-1/902 J-2/902 J-3/902	Video encoder (Analog composite video, S VIDEO), SDI output interface, Audio D/A converter, Analog BETACAM audio (LAU) PB, Interface/connector board (Analog composite video, S VIDEO, SDI, Audio monitor, Remote control connectors)
⑤	MB-919		System control, Servo control, RF equalizer, Inner ECC decoder, Timing generator
④	SE-604		Tension regulator sensor
⑪	SE-605		Cassette-in/down sensors
⑥	Power Supply Unit		Switching regulator, AC inlet
⑫	VFD Assembly		Front panel function (Buttons, Display, Jog dial/Shuttle ring)

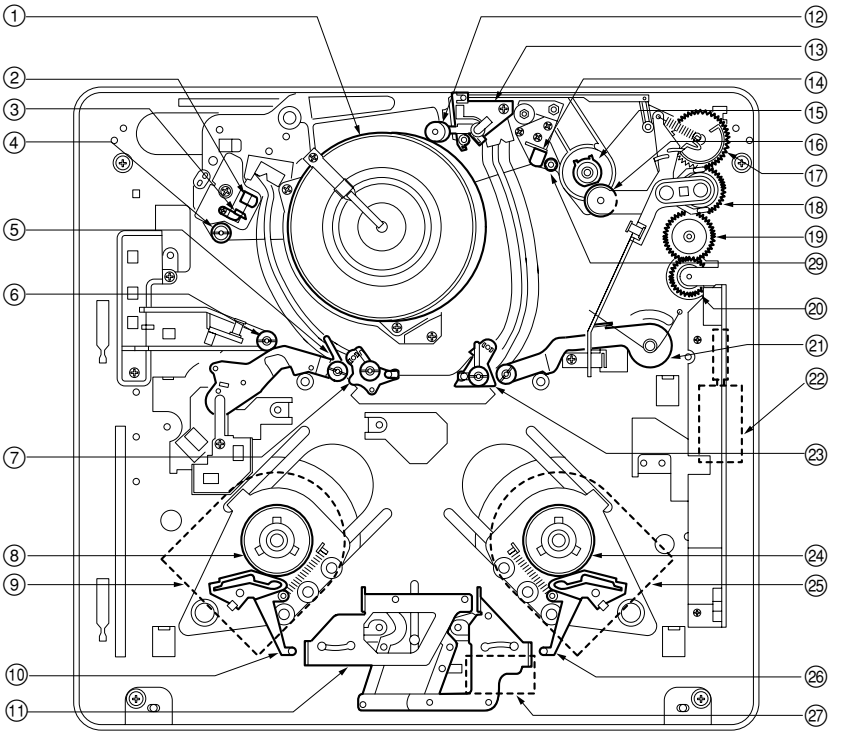
1-7. Location of Main Parts

1-7-1. Location of Printed Circuit Board/Power Supply Unit

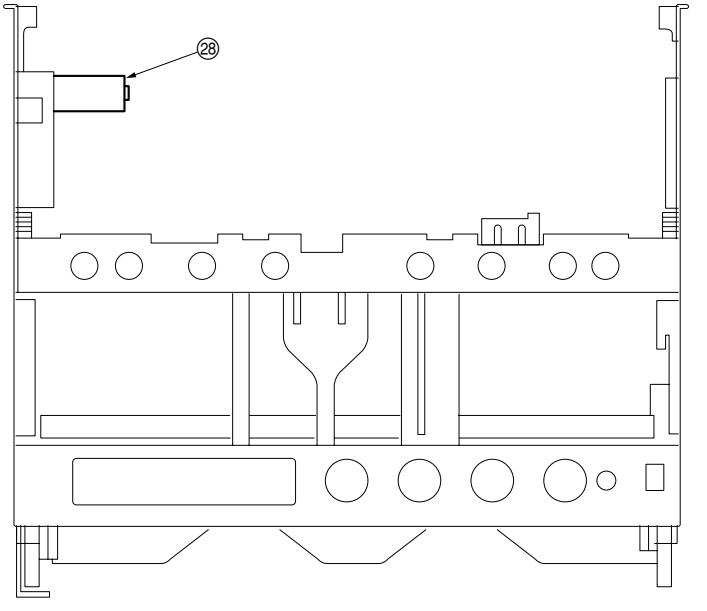
Refer to Section 1-6.

1-7-2. Location of Main Mechanical Parts

① Drum
② CTL Head
③ Tape Cleaner Assembly
④ S3 Guide Roller Assembly
⑤ S-TEN Arm Assembly
(S4 Guide Roller Assembly)
⑥ S5 Guide Roller Assembly
⑦ Shuttle S Block Assembly
(S1, S2 Guide Roller Assembly)
⑧ S Reel Table Assembly
⑨ S Reel Motor
⑩ S Brake Lever Assembly
⑪ Release Link Assembly
⑫ HC Roller Assembly
⑬ VH Cleaner Sub-assembly
⑭ AT Head
⑮ Capstan
⑯ Pinch Roller
⑰ Pressure Cam Gear
⑱ Elevator Cam
⑲ P3 Gear
⑳ P2 Gear
㉑ T4 Assembly
(T4 Guide Roller Assembly)
㉒ Threading Motor
㉓ Shuttle T Block Assembly
(T1, T2 Guide Roller Assembly)
㉔ T Reel Table Assembly
㉕ T Reel Motor
㉖ T Brake Lever Assembly
㉗ Plunger Solenoid
㉘ Cassette Compartment Motor
㉙ T3 Guide Roller

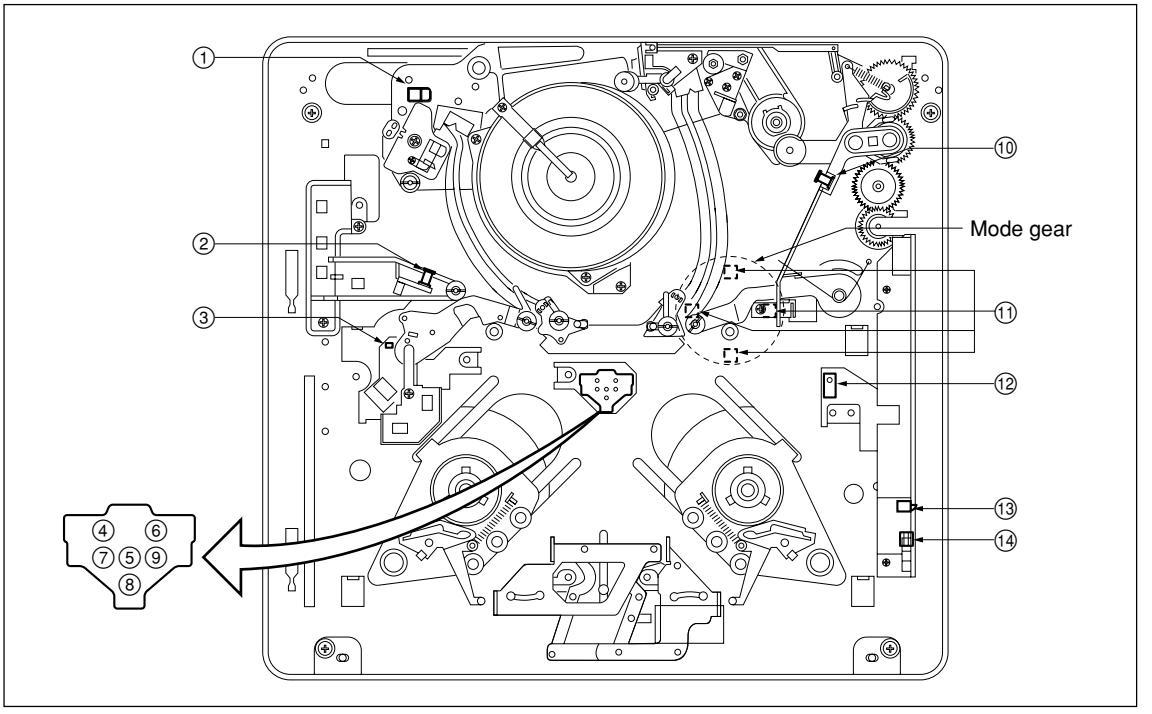


<Mechanical Deck>



<Cassette Compartment>

1-8. Location of Sensors and Functions



① **Dew Sensor**
Detects that dew condensation occurs inside the unit. This sensor informs of the dew condensation by error message “ERROR-10 : HUMID”.

② **Tape End Sensor**
Detects the tape end when tape is running in the FWD direction.

③ **S Tension Regulator Arm Sensor**
Detects position of the S side tension arm. Output of this sensor is input to the servo circuit of the S reel motor and controls the reel torque in order to minimize the variation of the tape tension at the S side during playback.

④ **Reel Hub-diameter Sensor**
Detects the presence or absence of the cassette reel hub diameter detection tab.
There are two sizes (small and large) of the reel hub diameter depending on the length of the tape contained in a cassette. This sensor detects the difference of the reel hub diameters.
Output of this sensor is input to the T and S reel motor servo circuits, and controls the rotation speed of the reel and controls the torque while a tape is running.

⑤ **Oxide/Metal Tape Sensor**
Detects the presence or absence of the metal tape detection tab of the Betacam/Betacam SP cassette.
This sensor detects whether the Betacam/Betacam SP cassette tape is an oxide tape or a metal tape.

⑥ **Tape Thickness Sensor**
Detects the presence or absence of the tape thickness detection tab of a cassette.
This sensor detects thickness of a tape contained in the cassette.

⑦⑧⑨ **Cassette Classification Sensors**
Detects the presence and absence of the cassette classification detection tabs (three locations) of a cassette.
These sensors detect if the cassette can be used in this unit or not.

⑩ **Tape Top Sensor**
Detects the tape end when a tape is running in the REW direction.

⑪ **Function Cam Sensors**
Detects the drawing-out positions of the tape guides such as the threading position, unthreading position, etc. This sensor controls the threading speed and the tape tension to the optimum values from the outputs of these sensors in order to protect tapes.

⑫ **Cassette Size Sensor**
Detects that a large cassette is inserted.
This sensor detects whether the inserted cassette tape is a large cassette or a small cassette.

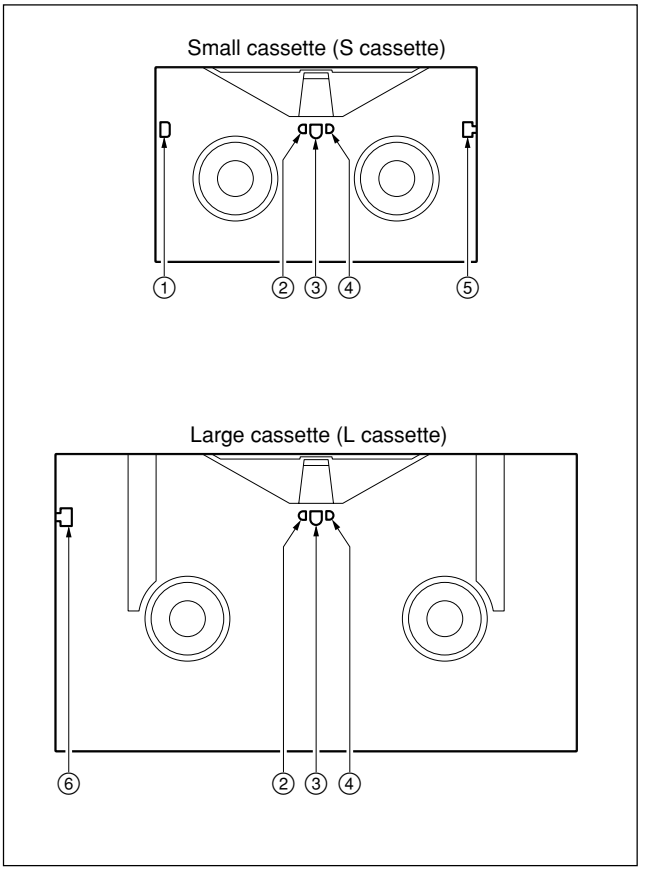
⑬ **Cassette Compartment Up Sensor**
Detects that the cassette compartment has moved to the EJECT position.

⑭ **Cassette In Sensor**
Detects that a cassette is inserted.

1-9. Description of Cassette Mechanism

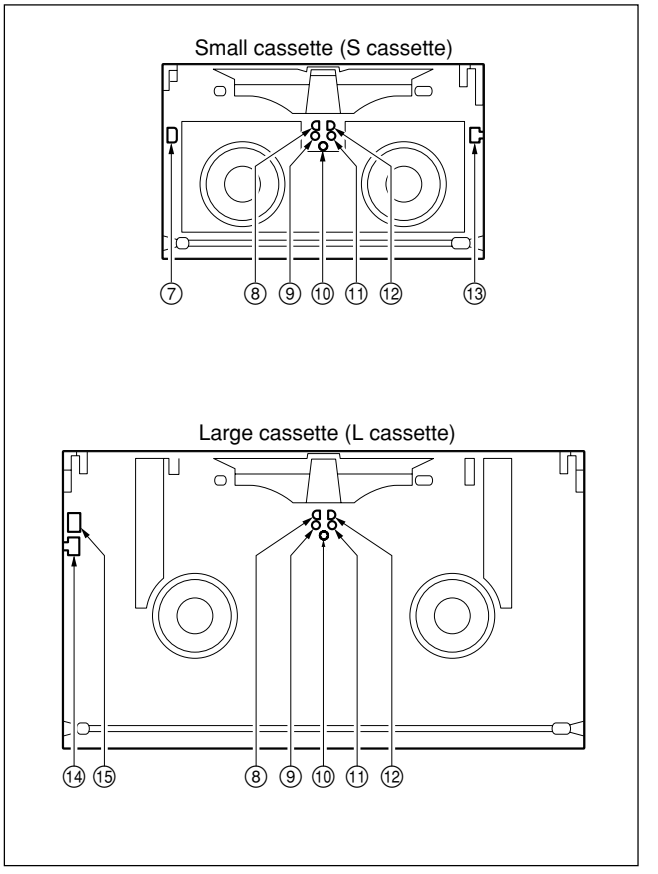
The record inhibition plug and the various detection tabs are provided on the back of the cassette tape.

Cassette for Betacam/Betacam SP



No.	Usage
①	Record inhibition tab of S cassette (For oxide tape)
②	Tape thickness detection tab With tub (closed) : thick (tape thickness 20 μm) Without tub (open) : thin (tape thickness 15 μm)
③	Metal tape detection tab With tub (closed) : oxide tape Without tub (open) : metal tape
④	Reel hub diameter detection tab With tub (closed) : small hub Without tub (open) : large hub
⑤	Record inhibition plug of S cassette (For metal tape)
⑥	Record inhibition plug of L cassette

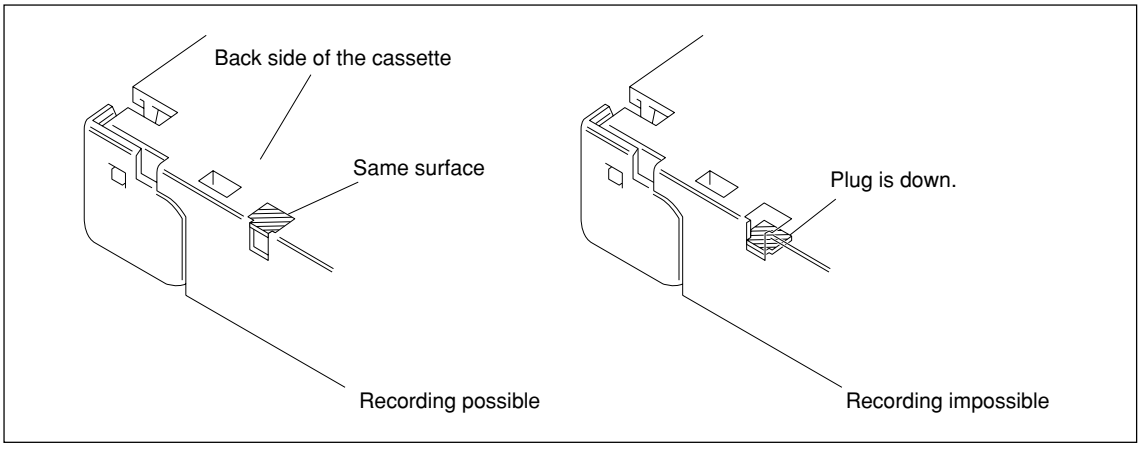
Dedicated Cassettes for DIGITAL BETACAM/ Betacam SX/MPEG IMX



No.	Usage
⑦	Analog record inhibition hole of S cassette
⑧	Tape thickness detection hole : always closed*1
⑨	Cassette classification detection tab (Refer to next page.)
⑩	Cassette classification detection tab (Refer to next page.)
⑪	Cassette classification detection tab (Refer to next page.)
⑫	Reel hub diameter detection tab With tub (closed) : small hub Without tub (open) : large hub (Cleaning tape, etc.)
⑬	Digital record inhibition plug of S cassette
⑭	Digital record inhibition plug of L cassette
⑮	Analog record inhibition hole of L cassette

*1 : As of today, there is only one tape thickness for each of the dedicated cassettes of DIGITAL BETACAM, BETACAM SX, and MPEG IMX.

Record Inhibition Plug



Cassette Classification Detection Tabs (○ : closed, ● : open)

Combination of three tabs shows the class of cassette tape.

Tub status ⑨ ⑪ ⑩	Class of cassette tape	Remarks
○○ ○	Betacam/Betacam SP	
●○ ○	Betacam SX	
○○ ●	Digital Betacam	This cassette is not usable in J-1 and J-2.
○● ○	HDCAM	This cassette is not usable.
●● ○	MPEG IMX	This cassette is not usable in J-1.
●○ ●, ○● ●, ●● ●	Other than the above class	These types of cassette are not usable.

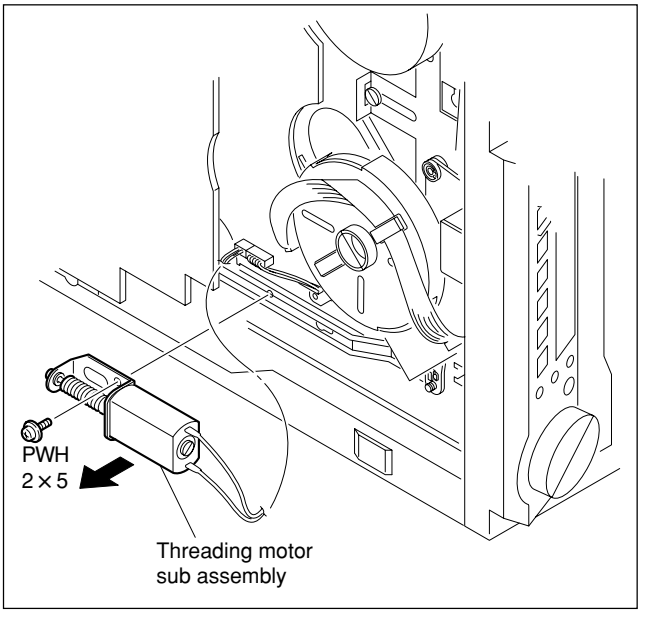
1-10. How to Remove the Slackened Tape

When a tape is slackened inside the unit, remove the cassette tape in the following procedure.

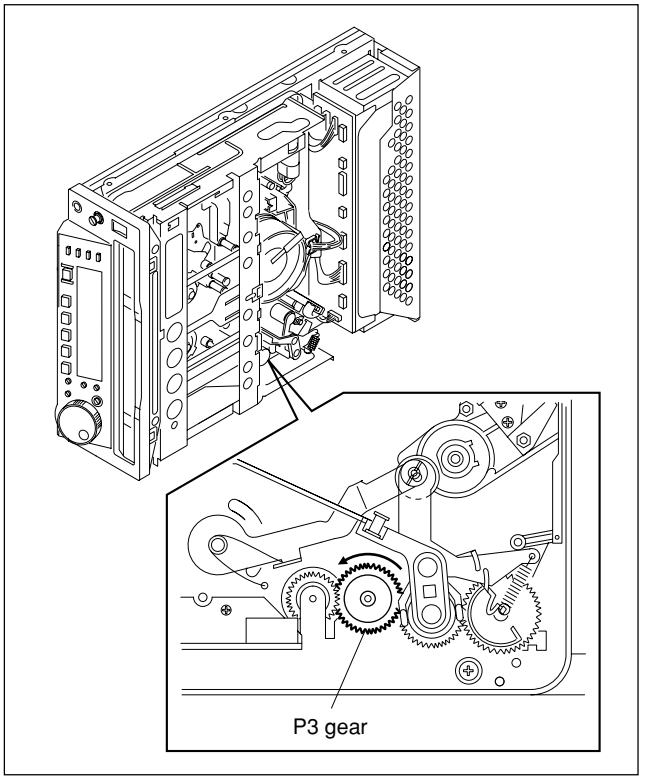
Note

Be cautious of removing the slacked tape not to damage the tape.

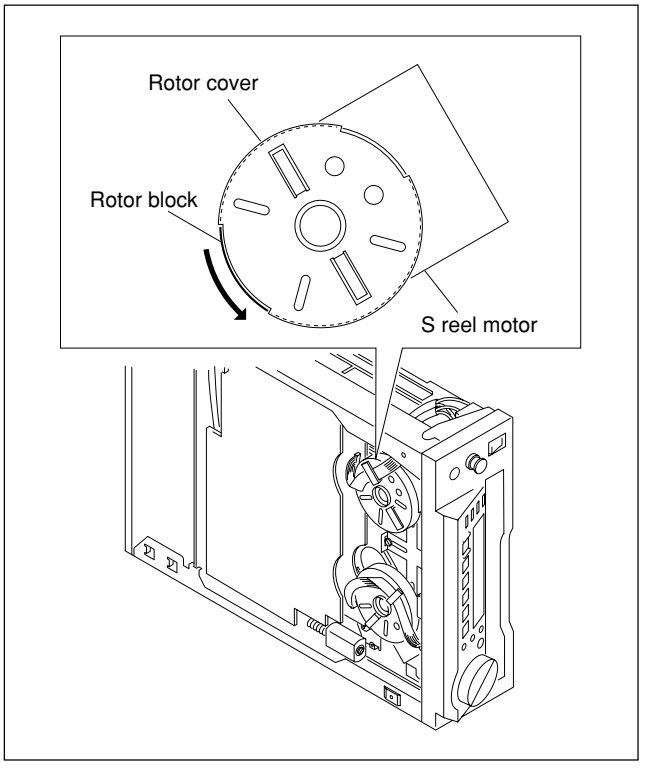
1. Turn off the POWER switch.
2. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
3. Remove the bottom plate assembly.
   (Refer to Section 1-4-2.)
4. Remove the screws and remove the threading motor sub assembly, but do not disconnect the harness of the motor.



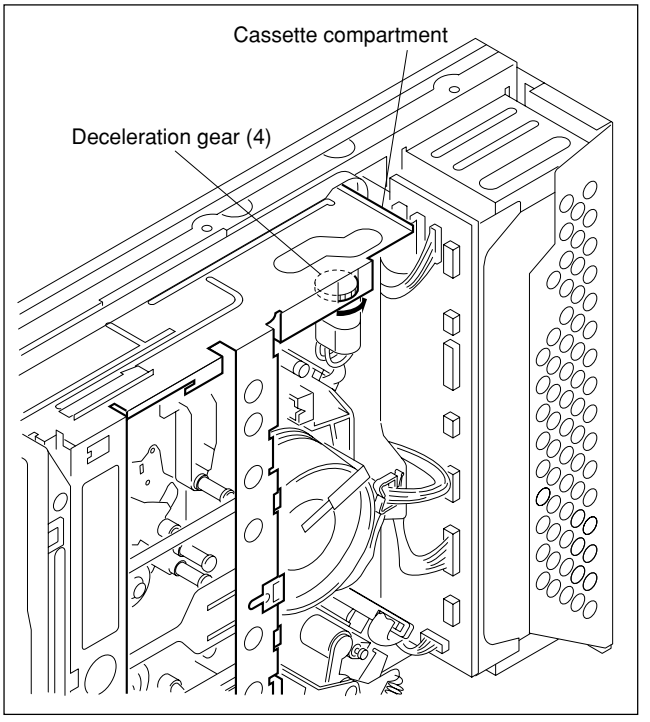
5. Slowly rotate the P3 gear by finger in the direction of the arrow to loosen the tape.



6. Rotate the rotor block of the S reel motor in the direction of the arrow by fingers through the cutaway part of the rotor cover to rewind the slacked tape inside the cassette.



7. Repeat steps 5 and 6 until the slackened tape is completely rewound into the cassette.
8. After confirming that the slackened tape is completely rewound into the cassette, rotate the deceleration gear (4) in the direction of the arrow by fingers to eject the cassette.



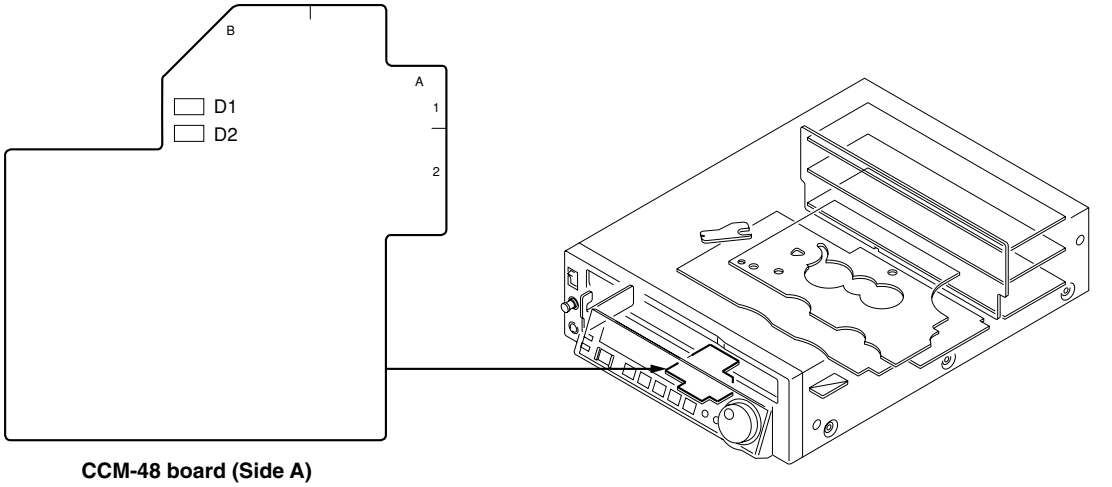
9. Install the threading motor sub assembly, the bottom plate assembly, and the top panel assembly by reversing the steps 2 to 4.

1-11. Explanation of LED Indicators on the Board

1-11-1. CCM-48 Board

Note

For removal and installation of the CCM-48 board, refer to Section 5-23-1.



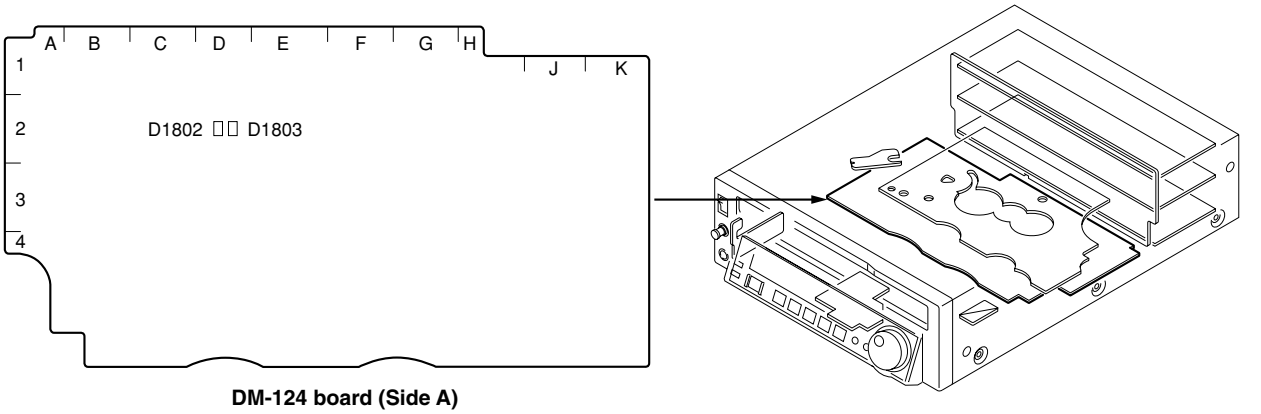
CCM-48 board (Side A)

LED No.	Name	Color	Description	Normal state
D1	CS	Green	Blinks when I/F IC (IC2/CCM-48 board) is communicating with SS CPU (IC1601/MB-919 board).	Lights off
D2	SINT	Green	Blinks when sending the data received from the memory label.	Lights off

1-11-2. DM-124 Board

Note

For removal and installation of the DM-124 board, refer to Section 5-23-2.



DM-124 board (Side A)

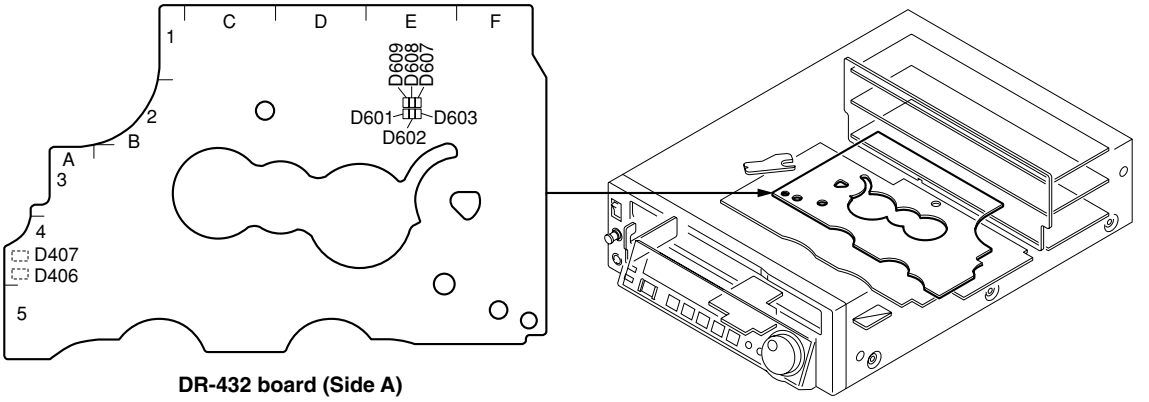
LED No.	Name	Color	Description	Normal state
D1802	STS	Green	Blinks when MPU (IC908/DM-124 board) is communicating with SS CPU (IC1601/MB-919 board).	Blinks
D1803	MAINTE	Green	Lights up when the bit-5, bit-6, or both of the DIP switch S1801 for adjustment are set to ON.	Lights off

1-11-3. DR-432 Board

Notes

Parts circled with broken lines are mounted on the B side.

For removal and installation of the DR-432 board, refer to Section 5-23-4.



DR-432 board (Side A)

LED No.	Name	Color	Description	Normal state
D406	CASSE IN	Green	Lights up when the cassette compartment is raised up.	–
D407	CASSE-COM UP	Green	Lights off when the cassette compartment goes down or the cassette compartment operates.	–
D601	FUNC.CAM	Green	Displays position of the elevator cam.	–
D602	FUNC.CAM	Green		
D603	FUNC.CAM	Green		

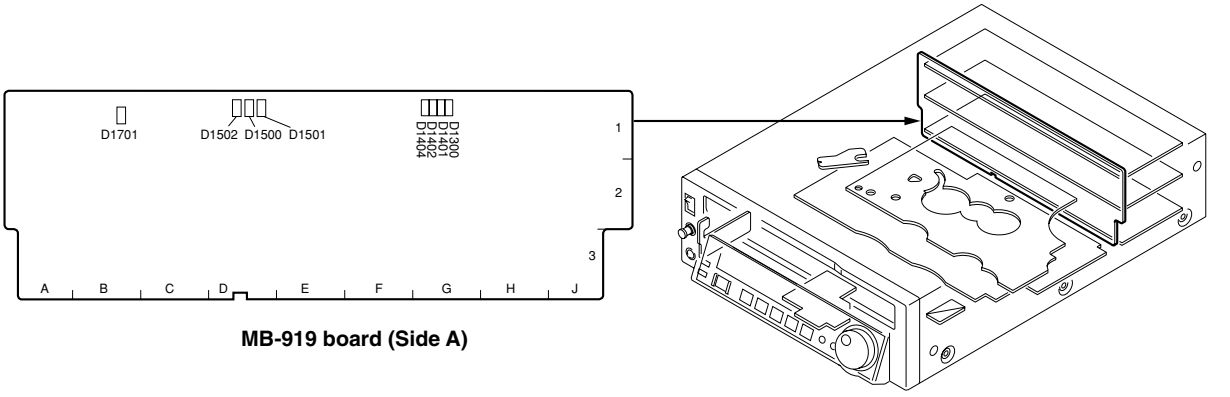
	UNTHREAD	HALF LOADING	PRE-PINCH ON	PINCH-ON	CLEANING
D601	ON	OFF	OFF	OFF	OFF
D602	ON	OFF	OFF	ON	ON
D603	ON	OFF	ON	OFF	ON

D607	+12.5 V	Red	Lights up when +12.5 V is supplied.	Lights up
D608	+5 V	Red	Lights up when +5 V is supplied.	Lights up
D609	−5 V	Red	Lights up when −5 V is supplied.	Lights up

1-11-4. MB-919 Board

Note

For removal and installation of the MB-919 board, refer to Section 5-23-7.



MB-919 board (Side A)

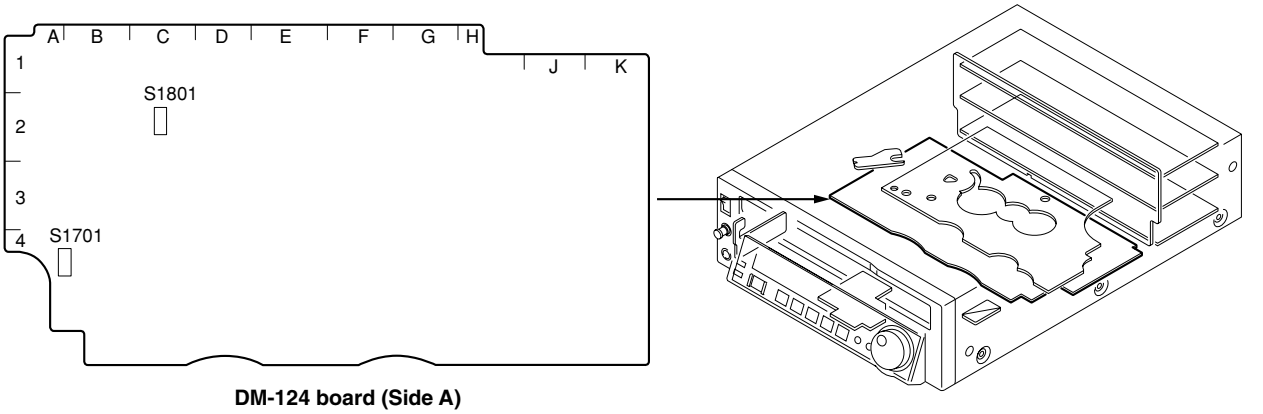
LED No.	Name	Color	Description	Normal state
D1300	NO SIGNAL	Green	Lights off when the playback data is not normal.	Lights up
D1401	–	Green	Not used. (Always lights off.)	Lights off
D1402	ANALOG MODE	Green	Lights up in the analog BETACAM playback mode.	In the analog BETACAM playback mode : Lights up In other modes : Lights off
D1404	EQ CPU	Green	Blinks when MPU (IC1408/MB-919 board) is communicating with SS CPU (IC1601/MB-919 board).	Blinks
D1500	ERR	Red	Lights up when an error occurs.	Lights off
D1501	CPU	Green	Blinks when SS CPU (IC1601/MB-919 board) is operating normally.	Blinks
D1502	LOG	Green	Lights up when the log is being updated.	Lights up
D1701	REF LOCK	Green	Lights up when REFERENCE is locked.	Lights up

1-12. Explanation of Switches on the Board

1-12-1. DM-124 Board

Note

Do not change the setting of the switches described as “Factory use”.
For removal and installation of the DM-124 board, refer to Section 5-23-2.



DM-124 board (Side A)

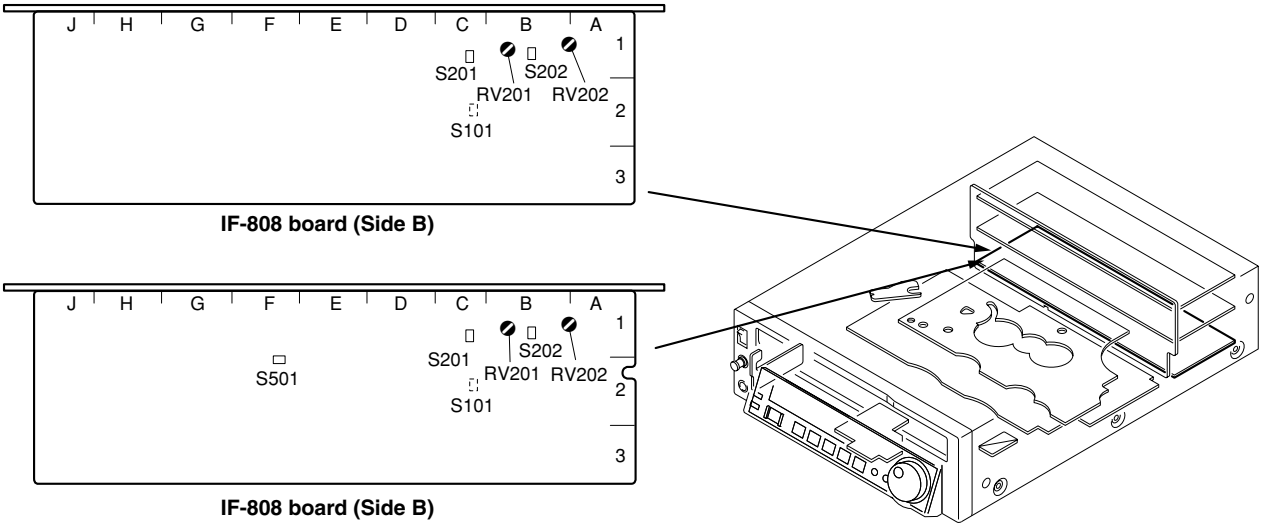
Ref. No.	Bit	Name	Description	Factory setting
S1701	1	Y MUTING	OFF : Normal mode ON : Luminance (Y) signal is muted.	OFF
	2, 3	–	Factory use	OFF
	4	C MUTING	OFF : Normal mode ON : Color difference signal is muted.	OFF
	5	COMB	If the color difference signal has line crawl which cannot be corrected with LCC*1, set the comb filter to ON. OFF : Comb filter OFF (Normal mode) ON : Comb filter ON	OFF
	6 to 8	–	Factory use	OFF
S1801	1	–	Factory use	OFF
	2	IMP OFF	VCO free-run adjustment of the DM-124 board OFF : Normal mode ON : Adjustment mode	OFF
	3	–	Factory use	OFF
	4	–	Not used	OFF
	5	AGC OFF	COSINE equalizer adjustment of the DM-124 board OFF : Normal mode ON : Adjustment mode	OFF
	6	DO ADJ	COSINE equalizer adjustment of the DM-124 board OFF : Normal mode ON : Adjustment mode	OFF
	7, 8	–	Not used	OFF

*1 : Line Crawl Canceler

1-12-2. IF-808/826 Board

Notes

- For removal and installation of the IF-808/826 board, refer to Section 5-23-6.
- Parts shown with broken line are mounted on the A side.



Monitor output level setting

Channel	Ref. No.	Output level and switch status (■ : Knob position)		
L/R	S101	–3 dBm 0 dBm +4 dBm	–3 dBm 0 dBm +4 dBm	–3 dBm 0 dBm +4 dBm
		+4 dBm/600 Ω (Factory setting)	0 dBm/600 Ω	–3 dBm/600 Ω

Note

Perform the head room setting with the output level setting. For details, refer to Section 3-5-6.

HEAD tune switches (for playback of Betacam/Betacam SP longitudinal audio)

At installation, it is not necessary to change settings of these switches.

Channel	Ref. No.	Function
CH1	S202	Adjusts the high frequency response of the CH1 head amplifier together with RV202. This switch is used in audio head damping adjustment. The switch setting differs depending on the result of adjustment.
CH2	S201	Adjusts the high frequency response of the CH2 head amplifier together with RV201. This switch is used in audio head damping adjustment. The switch setting differs depending on the result of adjustment.

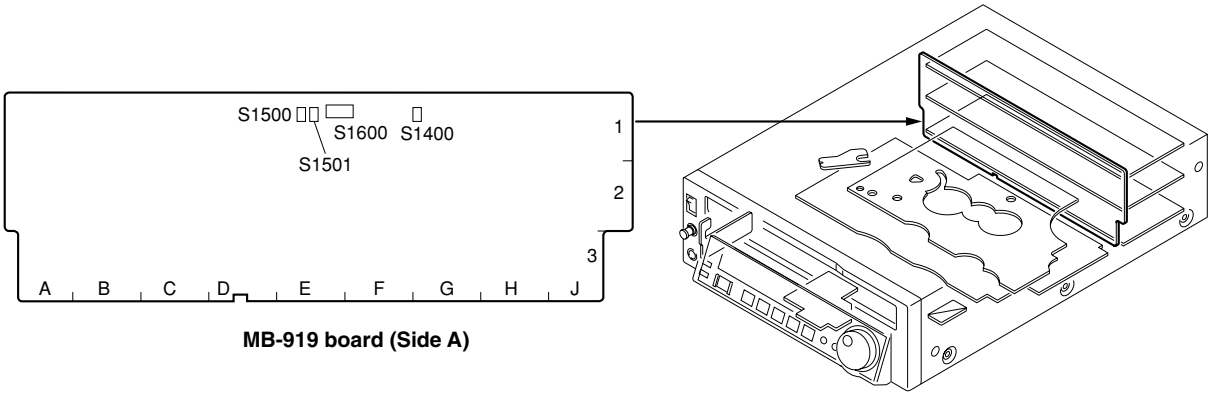
SDI VCO adjustment mode switch (IF-826 board only)

Ref. No.	Mode settings and switch status (■ : Knob position)	Factory setting
S501	(Normal operation) ■ ⬚ (Adjustment mode)	Normal operation

1-12-3. MB-919 Board

Note

Do not change the setting of the switches described as “Factory use”.
For removal and installation of the MB-919 board, refer to Section 5-23-7.



MB-919 board (Side A)

Ref. No.	Bit	Name	Function	Factory setting
S1400	–	–	Factory use	OFF
S1500	–	RESET	Press the RESET button to reset this unit.	–
S1501	–	LOG	Press the LOG button to stop or update the SV log.	–
S1600	1	–	Not used	OFF
	2	–	Not used	OFF
	3	–	Factory use	OFF
	4	–	Factory use	OFF
	5	–	Factory use	OFF
	6	–	Factory use	OFF
	7	–	Factory use	OFF
	8	–	Factory use	OFF

1-13. Circuit Protection Component (Fuse)

The circuit protection components such as fuse are used in this unit. When overcurrent flows or overheat occurs due abnormality inside the unit, these components blow. Be sure to use the component specified below when replacing the component. Replace the component after the cause of blowing the fuse is located and eliminated.
If any components other than the specified one is used for replacement, it may cause fire and electric shock. Be sure to use the specified component.

WARNING

Use the specified component only.
Fuse is an important part for maintaining safety of the unit.
If a component other than the specified one is used, it will develop into fire/electric-shock. Ensure to use the specified component.

Applicable board	Ref. No. (Address)	Part No.	Name
DR-432	F600 (E-1)	⚠ 1-576-269-11	Chip-type fuse 3.15 A, 125 V

1-14. NV-RAM

This unit uses the NV-RAMs (EEP-ROMs). These NV-RAMs store the adjustment data, various setting data, the hours meter data, the error log, and other data.

EEP-ROM : Electric Erasable P-ROM

After replacing the NV-RAM, take the following treatment.
"Stored data" and "Treatment after replacement" of the NV-RAM are shown in the following table.
For menu of maintenance mode, refer to Section 3.

Board Name	Ref. No.	Type	Stored data	Treatment after replacement
DM-124	IC1805	NV-RAM	DM-124 board adjustment data	Readjust the DM-124 board (Analog Betacam playback system). (Perform Section 8-8.)
DR-432	IC301	NV-RAM	Servo system adjustment data	Readjust the servo system. (Perform Section 8-3.)
			Hours meter data	None (Data are lost.)
MB-919	IC1402	NV-RAM	RF system adjustment data	Readjust the RF system. (Perform Section 8-4.)
	IC1503	NV-RAM	Setting data for setup menu	Set the setup menu again. (Refer to the operation manual for the re-setting.)
			Error log data	None (Data are lost.)
			VCO adjustment data	Perform the 27 MHz VCO adjustment. (Refer to Section 8-6-3.)
			Serial number	Set in the menu M31 of the maintenance mode.
			Audio setting	Set the audio setting again using the menus M370 to M373 of the maintenance mode.

Note

When the power is turned on after replacing the NV-RAM, ERROR (error code 96, 97, or 98) appears.
- Replacement of IC1503 on the MB-919 board : The error code 96 appears. (The respective settings are reset to the state when shipped from the factory.)
- Replacement of IC501 on the DR-432 board : The error code 97 appears.
- Replacement of IC1402 on the MB-919 board : The error code 98 appears.
- Replacement of IC1805 on the DM-124 board : The error code 98 appears.

1-15. Equipment List for Confirmation and Adjustment and Tool List

1-15-1. Confirmation and Adjustment Equipment

Use of equipment and equivalents shown below are recommended.
All of the following equipment are available on the market.

Equipment name	Type	Remark
Spectrum analyzer	ADVANTEST R3261A	Frequency band : over 100 MHz
Oscilloscope	TEKTRONIX TDS-460A	
Analog component waveform monitor*1	TEKTRONIX WFM-300A	
Serial component waveform monitor*2	TEKTRONIX WFM-600	SDI signal
Analog composite waveform/vector monitor	TEKTRONIX1750A or 1780R	For 525 system
	TEKTRONIX 1751A or 1781R	For 625 system
Audio analyzer	AUDIO PRECISION “System One” or “System Two”	
Audio level meter	HEWLETT PACKARD HP3400A	
Frequency counter	ADVANTEST TR5821AK	
Digital voltmeter	ADVANTEST TT6845	
Serial digital input supported monitor*2	SONY BVM-1410 (OP. BKM-2085-14)	
Network analyzer	ANRITSU MS-420B	
Terminator	–	75 Ω, BNC type
BNC T-type adapter	–	75 Ω
Blank tape	SONY BCT-184MLSX	Betacam SX tape, L size
	SONY BCT-MX series*3	MPEG IMX tape
	SONY BCT-D series*4	Digital Betacam tape

*1 : Only for J-1/901, J-2/901, and J-3/901.
*2 : Only for J-1/902, J-2/902, and J-3/902.
*3 : J-2 and J-3 only
*4 : J-3 only

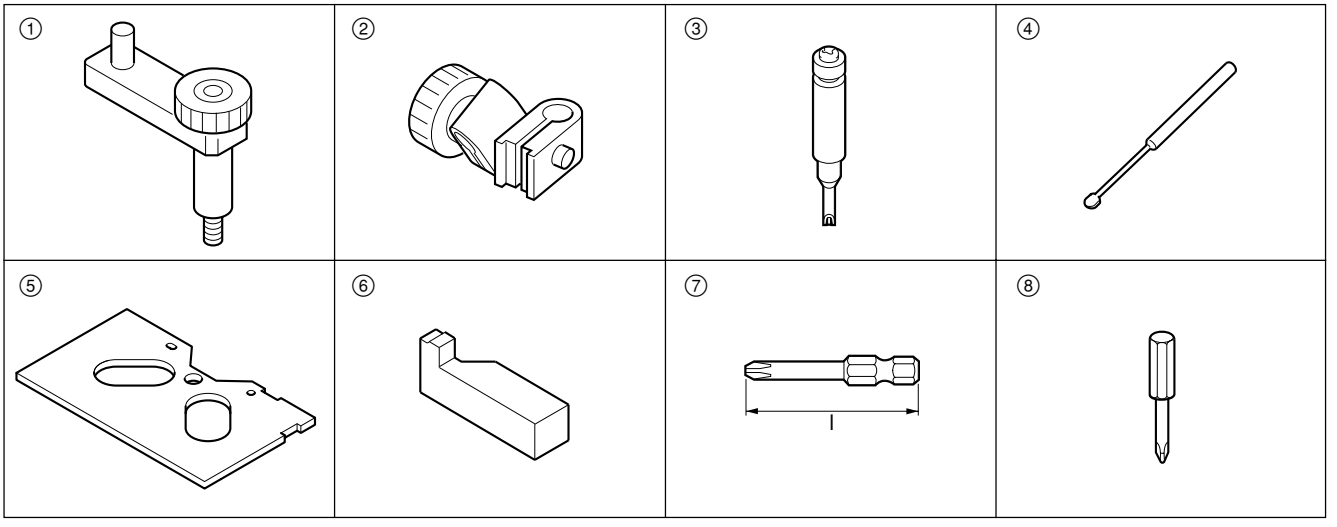
1-15-2. Tools

No.	Part No.	Name	Mark	Usage
①	J-6001-820-A	Upper drum eccentricity adjustment tool (3)	–	Upper drum eccentricity adjustment
②	J-6001-830-A	Upper drum eccentricity adjustment tool (2)	–	Upper drum eccentricity adjustment
③	J-6080-811-A	Tape guide adjustment driver	–	Tape running system adjustment
	J-6082-044-A	Tape guide adjustment driver	–	Tape running system adjustment
④	J-6080-840-A	Mirror (Small oval type)	–	Tape running system adjustment
⑤	J-6320-880-A	Cassette reference plate (L)	MW-088	Reel table height check
⑥	J-6324-150-A	Reel table height gauge	MW-415	Reel table height check and AT head azimuth adjustment
⑦	J-6325-110-A	Torque screwdriver's hexagonal bit (M1.4, l = 75 mm)	–	Tightening screws on mechanical deck
⑧	J-6325-380-A	Torque screwdriver's hexagonal bit (M2, l = 162 mm)	–	Tightening screws on mechanical deck
⑨	J-6325-400-A	Torque screwdriver (0.3 N•m) (3 kgf•cm)	–	Tightening screws (for M1.4 and M2 bits)
	J-6252-510-A	Torque screwdriver (0.6 N•m) (6 kgf•cm)	JB5251	Tightening screw (M2 bit)
⑩	J-6325-530-A	Upper drum eccentricity adjustment tool (6)	–	Upper drum eccentricity adjustment
⑪	J-6530-650-A	Head tip protrusion measurement gauge	–	Video head tip protrusion amount check
⑫	J-7031-040-A	Tension adjustment weight (76.7 gf)	PG-104	Tension regulator adjustment
⑬	J-7031-050-A	Tension adjustment weight (44 gf)	PG-105	Tension regulator adjustment
⑭	A-8317-304-A	Tape path harness, HN-257 board	–	Tape running system adjustment
⑮	A-8328-372-A	Extension board, EX-811	–	DPR board and IF board extension
⑯	A-8328-373-A	Extension board, EX-825	–	DM-124 board extension
⑰	A-6380-700-A	Master block	VH-070	AT head azimuth adjustment
⑱	3-184-527-01	Cleaning cloth (15 cm × 15 cm)	–	Cleaning
⑲	7-432-114-11	Locking compound 200 g	–	Protection for loosening screws
⑳	7-651-000-59	Grease 50 g (PG-662)	–	
㉑	7-661-018-18	Oil 50 ml (Mitsubishi Diamond Hydro Fluid NT-68)	–	
㉒	7-770-736-01	L-shaped hexagonal wrench (d = 1.27 mm)	–	
㉓	7-700-751-02	Nut driver (s = 5.5 mm)	–	
㉔*1	8-960-073-01	Alignment tape, ZR5-1	–	Video/audio system adjustment (525 system Digital Betacam)
	8-960-073-11	Alignment tape, ZR2-1	–	Tracking adjustment (525 system Digital Betacam)
	8-960-073-51	Alignment tape, ZR5-1P	–	Video/audio system adjustment (625 system Digital Betacam)
	8-960-073-61	Alignment tape, ZR2-1P	–	Tracking adjustment (625 system Digital Betacam)

*1 : J-3 only

No.	Part No.	Name	Mark	Remark
㉕	8-960-075-01	Alignment tape, SR5-1	–	Video/audio system adjustment (525 system Betacam SX)
	8-960-075-11	Alignment tape, SR2-1	–	Tracking adjustment (525 system Betacam SX)
	8-960-075-51	Alignment tape, SR5-1P	–	Video/audio system adjustment (625 system Betacam SX)
	8-960-075-61	Alignment tape, SR2-1P	–	Tracking adjustment (625 system Betacam SX)
	8-960-077-01	Alignment tape, MR5-1*2	–	Video/audio system adjustment (525 system MPEG IMX)
	8-960-077-51	Alignment tape, MR5-1P*2	–	Video/audio system adjustment (625 system MPEG IMX)
	8-960-077-61	Alignment tape, MR2-1P*2	–	Tracking adjustment (MPEG IMX)
㉖	8-960-096-01	Alignment tape, CR2-1B	–	Tracking adjustment (Analog Betacam NTSC)
	8-960-096-41	Alignment tape, CR5-1B (metal tape)	–	Video system adjustment (Analog Betacam NTSC)
	8-960-096-51	Alignment tape, CR2-1B PS	–	Tracking system adjustment (Analog Betacam PAL)
	8-960-097-44	Alignment tape, CR5-2A (oxide tape)	–	Video system adjustment (Analog Betacam NTSC)
	8-960-097-45	Alignment tape, CR8-1A (oxide tape)	–	Audio system adjustment (Analog Betacam NTSC)
	8-960-096-91	Alignment tape, CR5-1B PS (metal tape)	–	Video system adjustment (Analog Betacam PAL)
	8-960-096-86	Alignment tape, CR8-1B PS (metal tape)	–	Audio system adjustment (Analog Betacam PAL)
	8-960-098-44	Alignment tape, CR5-2A PS (oxide tape)	–	Video system adjustment (Analog Betacam PAL)
	8-960-098-45	Alignment tape, CR8-1A PS (oxide tape)	–	Audio system adjustment (Analog Betacam PAL)
㉗	9-919-573-01	Cleaning fluid	–	Cleaning
㉘	J-6381-380-A	S-BNC video cable	–	Video system check
㉙	J-6251-090-A	Torque screwdriver's hexagonal bit (d = 2.5 mm, l = 125 mm)	–	Upper drum replacement

*2 : J-2/J-3 only



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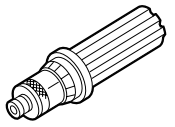

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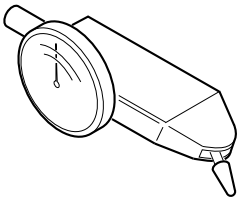

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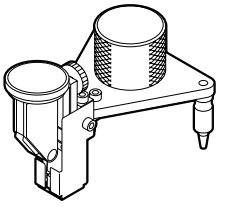

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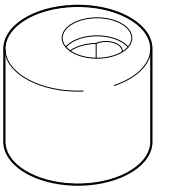

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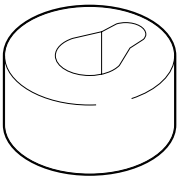

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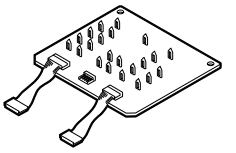

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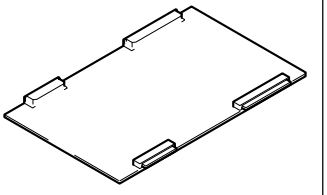

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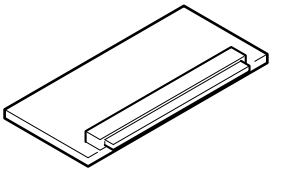

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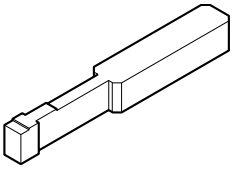

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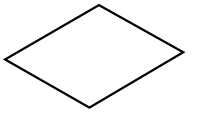

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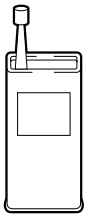

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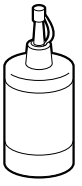

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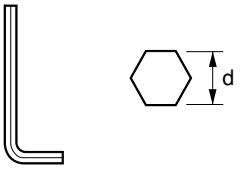

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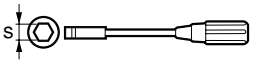

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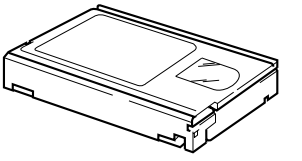

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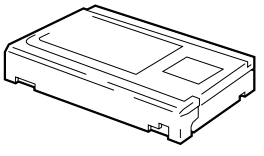

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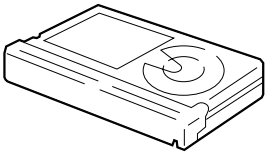

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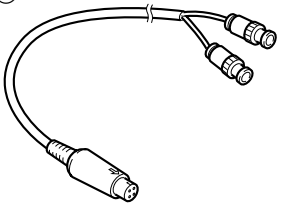

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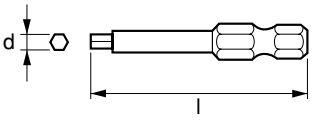


1-16. Alignment Tape

The alignment tapes to be used for adjustment of this unit are described below.

1. SR5-1 (Part No. 8-960-075-01) : For playback of 525 system Betacam SX
SR5-1P (Part No. 8-960-075-51) : For playback of 625 system Betacam SX

These alignments are used for video/audio/servo adjustments of J series.

Time (min. : sec.)	Digital video	Digital audio	CTL track
00:00 -	100 % color-bar	1 kHz sine wave, –20 dB FS	CTL
02:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
04:00 -	100 % color-bar	–∞ dB FS	CTL
06:00 -	100 % color-bar	20 Hz sine wave, –20 dB FS	CTL
08:00 -	100 % color-bar	20 kHz sine wave, –20 dB FS	CTL
10:00 -	Ramp	1 kHz sine wave, –20 dB FS	CTL
12:00 -	Ramp	1 kHz sine wave, 0 dB FS	CTL
14:00 -	Ramp	–∞ dB FS	CTL
16:00 -	Ramp	20 Hz sine wave, –20 dB FS	CTL
18:00 -	Ramp	20 kHz sine wave, –20 dB FS	CTL
20:00 -	100 % color-bar	1 kHz sine wave, –20 dB FS	CTL
22:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
24:00 -	100 % color-bar	–∞ dB FS	CTL
26:00 -	100 % color-bar	20 Hz sine wave, –20 dB FS	CTL
28:00 - 30:00	100 % color-bar	20 kHz sine wave, –20 dB FS	CTL

2. SR2-1 (Part No. 8-960-075-11) : For playback of 525 system Betacam SX
SR2-1P (Part No. 8-960-075-61) : For playback of 625 system Betacam SX

These alignment tapes are used for the tape running adjustment of J series.

Time (min. : sec.)	Digital video	LAU track	CTL track
00:00 -	3.212 MHz (A CH only)	SR2-1 : 3 kHz, 0 VU	CTL
(Pulse*)		SR2-1P : 3.15 kHz, 0 VU	
15:00 -	A CH : 3.212 MHz	SR2-1 : 3 kHz, 0 VU	CTL
	B CH : 6.424 MHz	SR2-1P : 3.15 kHz, 0 VU	
20:00 -	12.848 MHz (All CH)	SR2-1 : 3 kHz, 0 VU	CTL
		SR2-1P : 3.15 kHz, 0 VU	
25:00 - 27:00	100 % color-bar (All CH)	No signal	CTL

* : The segment of the alignment tape from 00:00 to 15:00 does not have the recording of the time code data.
The time that is interpolated by the CTL signal is displayed.
("7:3 pulse" is recorded on the time code track during the segment from 00:00 to 15:00.)

3. MR5-1 (Part No. 8-960-077-01) : For playback of 525 system MPEG IMX
MR5-1P (Part No. 8-960-077-51) : For playback of 625 system MPEG IMX

These alignment tapes are used for video/audio adjustments of J-2/J-3 and for servo adjustment of J-2.

Time (min. : sec.)	Digital video	Digital audio	CTL track
00:00 -	100 % color-bar	1 kHz sine wave, –20 dB FS	CTL
02:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
04:00 -	100 % color-bar	–∞ dB FS	CTL
06:00 -	100 % color-bar	20 Hz sine wave, –20 dB FS	CTL
08:00 -	100 % color-bar	20 kHz sine wave, –20 dB FS	CTL
10:00 -	Ramp	1 kHz sine wave, –20 dB FS	CTL
12:00 -	Ramp	1 kHz sine wave, 0 dB FS	CTL
14:00 -	Ramp	–∞ dB FS	CTL
16:00 -	Ramp	20 Hz sine wave, –20 dB FS	CTL
18:00 -	Ramp	20 kHz sine wave, –20 dB FS	CTL
20:00 -	100 % color-bar	1 kHz sine wave, –20 dB FS	CTL
22:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
24:00 -	100 % color-bar	–∞ dB FS	CTL
26:00 -	100 % color-bar	20 Hz sine wave, –20 dB FS	CTL
28:00 - 30:00	100 % color-bar	20 kHz sine wave,–20 dB FS	CTL

4. MR2-1P (Part No. 8-960-077-61) : For playback of MPEG IMX

This alignment tape is used for the tape running adjustment of J-2.
(This alignment tape can be used in both of 525 and 625 systems.)

Time (min. : sec.)	Digital video/Digital audio	CTL track
00:00 - (Pulse*)	8T (2.9 MHz) (A/C CH only)	CTL
15:00 -	8T (2.9 MHz) (B/D CH only)	CTL
20:00 - 25:00	2T (11.4 MHz) (All CH)	CTL

* : The segment of the alignment tape from 00:00 to 15:00 does not have the recording of the time code data.
The time that is interpolated by the CTL signal is displayed.
("7:3 pulse" is recorded on the time code track during the segment from 00:00 to 15:00.)

5. ZR5-1 (Part No. 8-960-073-01) : For playback of 525 system Digital Betacam
ZR5-1P (Part No. 8-960-073-51) : For playback of 625 system Digital Betacam

These alignment tapes are used for video/audio/servo adjustments of J-3.

Time (min. : sec.)	Digital video	Digital audio	CUE	CTL track
00:00 -	100 % color-bar	1 kHz sine wave, –20 dB FS	1 kHz 0 VU	CTL
01:25 -	100 % color-bar	1 kHz sine wave, –20 dB FS	No signal	CTL
01:30 -	100 % color-bar	1 kHz sine wave, –20 dB FS	1 kHz –20 VU	CTL
02:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	1 kHz –20 VU	CTL
02:25 -	100 % color-bar	1 kHz sine wave, 0 dB FS	No signal	CTL
02:30 -	100 % color-bar	1 kHz sine wave, 0 dB FS	3 kHz –20 VU	CTL
02:55 -	100 % color-bar	1 kHz sine wave, 0 dB FS	No signal	CTL
03:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	7 kHz –20 VU	CTL
03:25 -	100 % color-bar	1 kHz sine wave, 0 dB FS	No signal	CTL
03:30 -	100 % color-bar	1 kHz sine wave, 0 dB FS	10 kHz –20 VU	CTL
03:55 -	100 % color-bar	1 kHz sine wave, 0 dB FS	No signal	CTL
04:00 -	100 % color-bar	–∞ dB FS	12 kHz –20 VU	CTL
04:25 -	100 % color-bar	–∞ dB FS	No signal	CTL
04:30 -	100 % color-bar	–∞ dB FS	90 Hz –20 VU	CTL
04:55 -	100 % color-bar	–∞ dB FS	No signal	CTL
05:00 -	100 % color-bar	–∞ dB FS	Repeat (00:00 - 10:00)	CTL
06:00 -	100 % color-bar	20 Hz sine wave, –20 dB FS	Repeat (00:00 - 10:00)	CTL
08:00 -	100 % color-bar	20 kHz sine wave, –20 dB FS	Repeat (00:00 - 10:00)	CTL
10:00 - 20:00	Ramp	Repeat (00:00 - 10:00)	Repeat (00:00 - 10:00)	CTL

6. ZR2-1 (Part No. 8-960-073-11) : For playback of 525 system Digital Betacam
ZR2-1P (Part No. 8-960-073-61) : For playback of 625 system Digital Betacam

These alignment tapes are used for the tape running adjustment of J-3.

Time (min. : sec.)	Digital video/Digital audio	CUE	CTL
00:00 - (Pulse*)	4 MHz (A CH only)	1 kHz 0 VU	CTL
15:00 -	4 MHz (A/C CH only) 8 MHz (B/D CH only)	12 kHz 0 VU	CTL
20:00 -	16 MHz (All CH)	12 kHz 0 VU	CTL
25:00 - 27:00	50% Flat field (All CH)	–	CTL

* : The segment of the alignment tape from 00:00 to 15:00 does not have the recording of the time code data.
The time that is interpolated by the CTL signal is displayed.
("7:3 pulse" is recorded on the time code track during the segment from 00:00 to 15:00.)

7. CR2-1B (Part No. 8-960-096-01) : For playback of NTSC analog Betacam
CR2-1B PS (Part No. 8-960-096-51) : For playback of PAL analog Betacam

These alignment tapes are used for tracking adjustment of J series.

Time (min. : sec.)	Video	AFM	LAU track	CTL track
00:00 - 28 : 00 (Pulse*)	Y : 4 MHz C : 5 MHz	No signal	No signal	CTL

* : The entire tape length of the CR2-1B does not have the recording of the time code data.
The time that is interpolated by the CTL signal is displayed.
("7:3 pulse" is recorded on the time code track during the segment from 00:00 to 15:00.)

8. CR5-1B (Part No. 8-960-096-41) : For playback of NTSC analog Betacam
CR5-1B PS (Part No. 8-960-096-91) : For playback of PAL analog Betacam

These alignment tapes are used for Betacam video/audio adjustment of J series.

Time (min. : sec.)	Video	AFM	LAU tracks	CTL track
00:00 -	RF sweep	No signal	No signal	CTL
02:00 -	60 % H sweep (CTDM)	No signal	No signal	CTL
05:00 -	Pulse & Bar (CTDM)	No signal	No signal	CTL
08:00 -	60 % multi-burst	No signal	No signal	CTL
11:00 -	Pulse & Bar	No signal	No signal	CTL
14:00 -	CR5-1B : 75 % color-bar CR5-1B PS : 100 % color-bar	400 kHz sine wave with 25 kHz deviation	No signal	CTL
16:30 -	CR5-1B : 75 % color-bar CR5-1B PS : 100 % color-bar	400 kHz sine wave with 75 kHz deviation	No signal	CTL
17:00 -	CR5-1B : 50 % bowtie & 12.5T CR5-1B PS : 50 % bowtie & 10T	No signal	No signal	CTL
19:00 -	Line 17	No signal	No signal	CTL
22:00 -	Quad phase	No signal	No signal	CTL
24:00 -	Flat field	No signal	No signal	CTL
26:00 -	CR5-1B : 75 % color-bar with Drop-out CR5-1B PS : 100 % color-bar with Drop-out	No signal	No signal	CTL
28:00 - 30:00	Composite V sweep with VISC	No signal	No signal	CTL

9. CR5-2A (Part No. 8-960-097-44) : For playback of NTSC analog Betacam
CR5-2A PS (Part No. 8-960-098-44) : For playback of PAL analog Betacam

These alignment tapes are used for Betacam video adjustment of J series.

Time (min. : sec.)	Video	LAU tracks	CTL track
00:00 -	75 % color-bar	No signal	CTL
03:00 -	60 % multi-burst	No signal	CTL
06:00 -	CR5-2A : 50 % bowtie & 12.5T CR5-2A PS : 50 % bowtie & 10T	No signal	CTL
09:00 -	Pulse & Bar	No signal	CTL
11:00 -	Quad phase	No signal	CTL
13:00 - 15:00	Composite monoscope (Switching position is shifted)	No signal	CTL

10. CR8-1A (Part No. 8-960-097-45) : For playback of NTSC analog Betacam
CR8-1A PS (Part No. 8-960-098-45) : For playback of PAL analog Betacam

These alignment tapes are used for Betacam audio adjustment of J series.

Time (min. : sec.)	LAU tracks	CTL track	Video
00:00 -	1 kHz sine wave, 0 VU	CTL	No signal
02:55 -	No signal	CTL	No signal
03:00 -	10 kHz sine wave, –10 VU	CTL	No signal
04:55 -	No signal	CTL	No signal
05:00 -	1 kHz sine wave, –20 VU	CTL	No signal
05:55 -	No signal	CTL	No signal
06:00 -	40 Hz sine wave, –20 VU	CTL	No signal
06:25 -	No signal	CTL	No signal
06:30 -	7 kHz sine wave, –20 VU	CTL	No signal
06:55 -	No signal	CTL	No signal
07:00 -	10 kHz sine wave, –20 VU	CTL	No signal
07:25 -	No signal	CTL	No signal
07:30 -	15 kHz sine wave, –20 VU	CTL	No signal
07:55 -	No signal	CTL	No signal
08:00 - 10:00	1 kHz sine wave, 0 VU	1 kHz sine wave, 0 VU	No signal

11. CR8-1B PS (Part No. 8-960-096-86) : For playback of PAL analog Betacam

This alignment tape is used for Betacam audio adjustment of J series.

Time (min. : sec.)	LAU tracks	CTL track	Video	AFM
00:00 -	1 kHz sine wave, 0 VU	CTL	No signal	No signal
02:55 -	No signal	CTL	No signal	No signal
03:00 -	15 kHz sine wave, 0 VU	CTL	No signal	No signal
04:55 -	No signal	CTL	No signal	No signal
05:00 -	1 kHz sine wave, –20 VU	CTL	No signal	No signal
05:55 -	No signal	CTL	No signal	No signal
06:00 -	40 Hz sine wave, –20 VU	CTL	No signal	No signal
06:25 -	No signal	CTL	No signal	No signal
06:30 -	7 kHz sine wave, –20 VU	CTL	No signal	No signal
06:55 -	No signal	CTL	No signal	No signal
07:00 -	10 kHz sine wave, –20 VU	CTL	No signal	No signal
07:25 -	No signal	CTL	No signal	No signal
07:30 -	15 kHz sine wave, –20 VU	CTL	No signal	No signal
07:55 - 08:00	No signal	CTL	No signal	No signal

1-17. How to Extend the Circuit Board for Servicing

The following two types of the circuit board extension tool are used in this unit. This section describes how to use the circuit board extension tools.

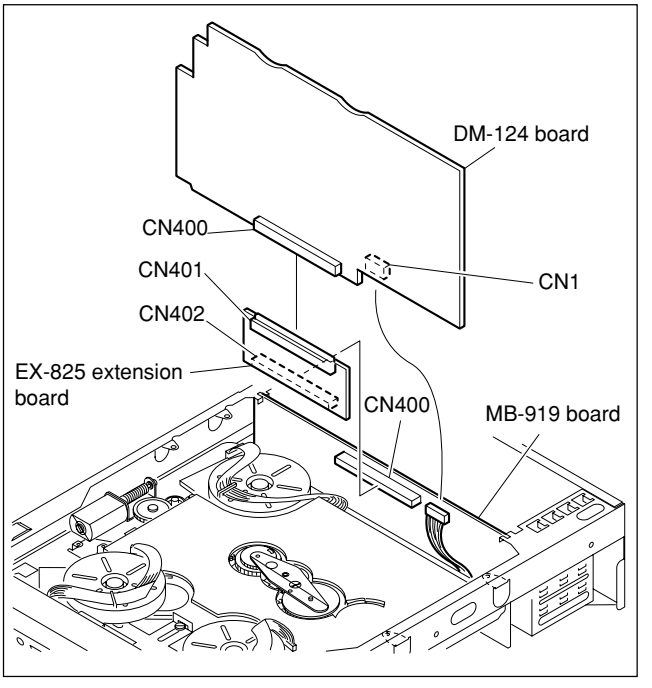
To extend the DPR board and the IF board
Name: Extension board, EX-811
Sony part No.: A-8328-372-A

To extend the DM-124 board
Name: Extension board, EX-825
Sony part No.: A-8328-373-A

DM-124 Board

Extend the DM-124 board using the EX-825 extension board.

1. Remove the DM-124 board. (Refer to Section 5-23-2.)
2. Insert the connector CN401 on the EX-825 extension board to the connector CN400 on the DM-124 board.
3. Insert the connector CN402 on the extension board to the connector CN400 on the MB-919 board.
4. Reconnect the harness to the connector CN1 on the DM-124 board.



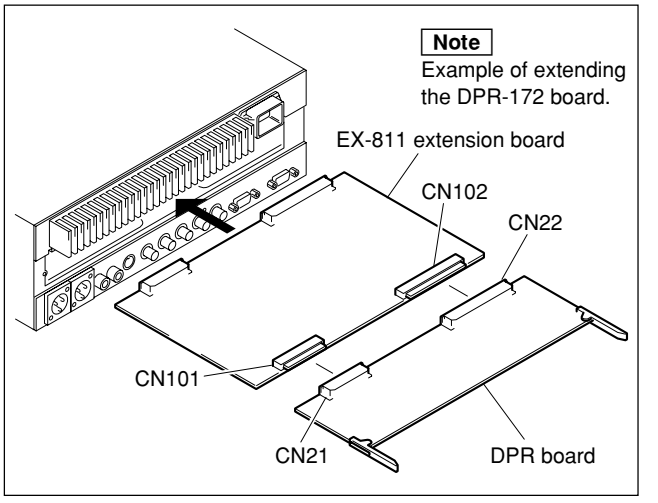
DR-432 Board

To check the circuits on the DR-432 board, extend the DM-124 board.

DPR-172/174 Board

Extend the DPR board using the EX-811 extension board.

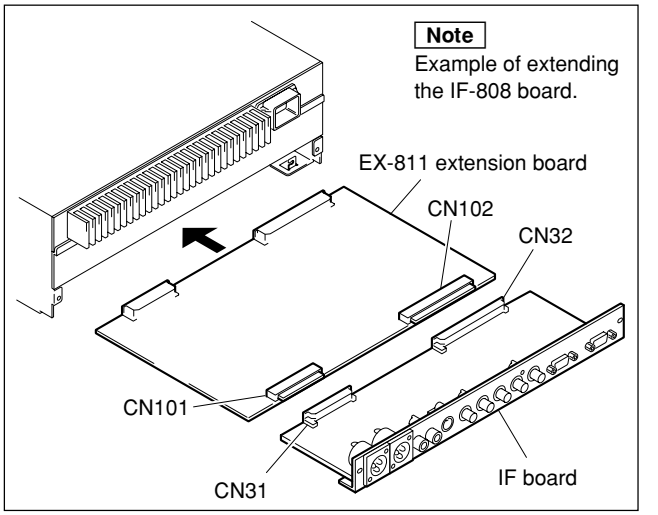
1. Remove the DPR board. (Refer to Section 5-23-3.)
2. Insert the connectors CN101 and CN102 on the EX-811 extension board to the connectors CN21 and CN22 on the DPR board.
3. Insert the extended DPR board into the slot where the DPR board is removed.



IF-808/826 Board

Extend the IF board using the EX-811 extension board.

1. Remove the IF board. (Refer to Section 5-23-6.)
2. Insert the connectors CN101 and CN102 on the EX-811 extension board to the connectors CN31 and CN32 on the IF board.
3. Insert the extended IF board into the slot where the IF board is removed.



1-18. Built-in Test Signals

This unit contains the built-in Video and Audio test signal generators.
Use any of the following two methods to generate the test signal from the built-in test signal generators. One method is to use the Setup Extension Menu and the other method is to use the Maintenance Mode.

Note

The test signal is not output from the built-in test signal generators when a cassette remains inserted. Remove the cassette.

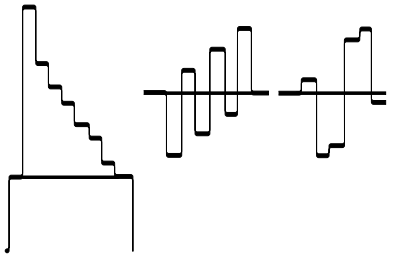
1-18-1. Built-in Video Test Signal

The built-in video test signal is the 75 % color bars (D-1 format) only.

- Maintenance Mode
  C21 : VIDEO/AUDIO TEST SG
  For details, refer to “3-2-4. AUDIO/VIDEO CHECK mode (C2)”.

The waveforms outputted from the built-in signal generator are illustrated below.
The illustration is created by observing the component video signal on the waveform monitor (H rate, PARADE display).

D-1 format 75 % color bars



1-18-2. Built-in Audio Test Signal

The built-in audio test signal is 1 kHz sine signal only.

- Setup Extended Menu
  ITEM-808 : INTERNAL AUDIO SIGNAL GENERATOR
  For details, refer to the Operation Manual.
- Maintenance Mode
  C21 : VIDEO/AUDIO TEST SG
  For details, refer to “3-2-4. AUDIO/VIDEO CHECK mode (C2)”.

1-19. Setup Menu : F-series

This section describes the F-series items of the setup menu. F-series items are mainly used in the adjustment or maintenance.
For the setup menu items other than the F-series, refer to the Operation Manual.

1-19-1. Menu Operation of F-series

Preparation

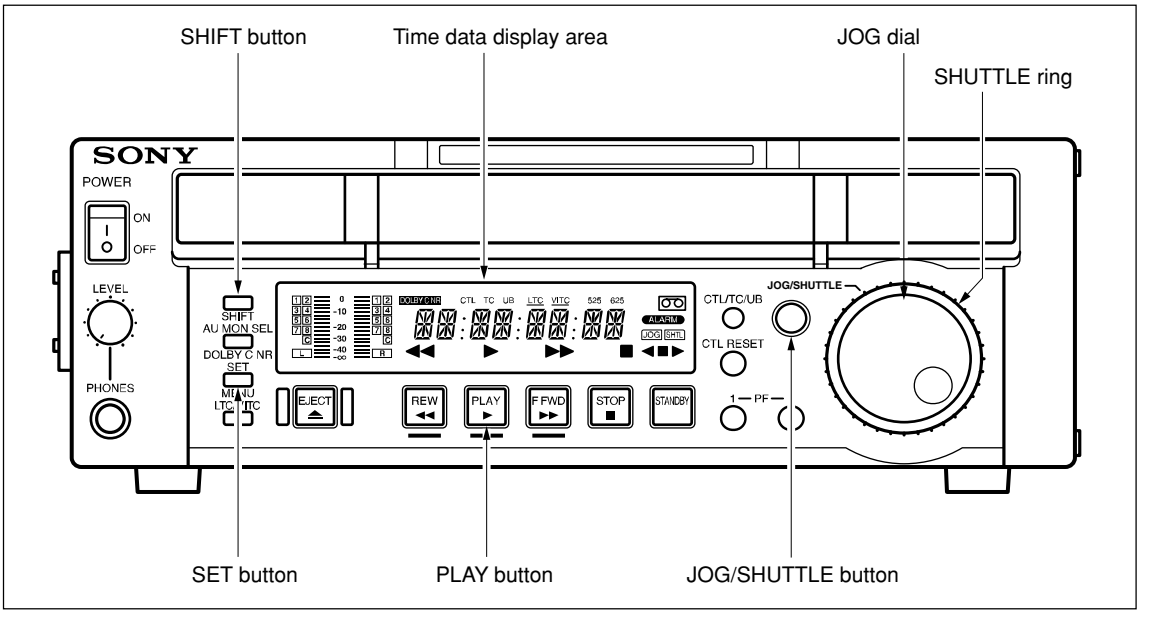
To display this menu, set ITEM-099 : MANU GRADE to ENHAN in the setup menu.

Starting up the setup menu

Press the MENU (SHIFT + SET) buttons to show the setup menu (number) on the time data display area.

Basic operation of menu

- **To select ITEM-F-series**
  While pressing the PLAY button, rotate the JOG dial (or SHUTTLE ring) to select the desired F-series menu number on the time data display area.
- **To change DATA**
  While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring).
- **To set DATA**
  Press the SET button.



1-19-2. F-series Menu Items

The F-series menu contains the following items.
In the "Setting" column of the table, factory default settings are indicated by an enclosing box.

No.	ITEM	Setting	Description
F01	AUDIO NR IN SP MODE	[ON] PANEL	Turns ON or OFF the Dolby NR when playing back a metal tape. ON : The Dolby NR is turned ON when a metal tape is used. PANEL : The Dolby NR is turned ON or OFF in accordance with the indication on the control panel. **[Notes]** • This item is used only for the analog Betacam longitudinal audio adjustment in the 625 system. So, be sure to return to the factory default setting "ON" after completing the specified adjustment. • When an oxide tape is playbacked, the Dolby NR is turned ON or OFF in accordance with the indication on the control panel regardless of the setting of this item.
F02	EMERGENCY TAPE PROTECTION	[ENA] DIS	Sets whether or not to implement the tape protection operation when VTR detects an error in its tape running system. ENA : The tape protection operation is implemented. DIS : The tape protection operation is not implemented. **[Note]** This item is used only for the servo and mechanical system adjustments. Be sure to return to the factory default setting "ENA" after completing the specified adjustment.
F10	REPEAT MODE	[OFF] PLAY	Sets whether or not to implement the repeat playback over the entire length of a tape. OFF : The repeat playback is not implemented. PLAY : The repeat playback is implemented.
F16	DEVICE TYPE MODIFY : 0H	[0] 1 : FFFF	Determines the response data to be returned for the 9-pin remote command DEVICE TYPE REQUEST (00h, 11h). 0 : The device type that is unique to this unit is returned. Other than 0 : The value that is entered here is returned. (The upper two digits become the DATA-1 and the lower two digits become the DATA-2.) **[Note]** Entire operations of the VTR including TTP are never affected by this setting regardless of any of the above settings. Operations of the VTR from the 9-pin remote command are not guaranteed except for the factory default setting ("0").
F47	TRACKING CONTROL	OFF [AUTO] MANUAL	Determines the tracking control operation. OFF : The tracking control function is disabled. AUTO : The auto tracking control is performed. MANUAL : The tracking is controlled on turning the JOG dial (or SHUTTLE ring) in the PLAY mode. **[Note]** When the "MANUAL" is selected, the setting of the setup extended menu ITEM-101: SELECTION FOR JOG/SHUTTLE DIAL ENABLE becomes invalid. The keyboard operation becomes valid. In the manual tracking control state, the indicators [JOG], [SHUTTLE], and ◁□▷ on the control panel blinks during the PLAY mode only.

1-20. Treatment after Replacing or Repairing the Board

When any of the following mounted circuit boards is replaced or repaired, the treatment (adjustment or operational check) as described below is required.
For replacement of the MB-919 board, the switch setting check as described below is required before starting to replace the MB-919 board.

Note

To use the maintenance mode, connect a video monitor to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.
(For the maintenance mode, refer to Section 3.)

1-20-1. CCM-48 Board

Upon completion of replacement and repair of this board, perform the Tele-File adjustment (Section 8-9.)

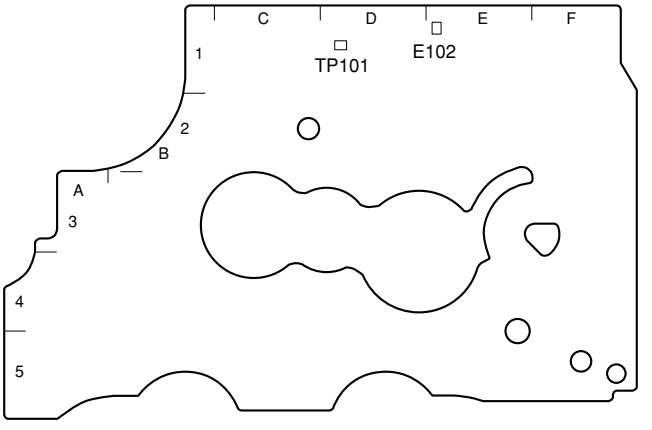
1-20-2. DM-124 Board

Upon completion of replacement and repair of this board, perform the analog Betacam video playback system adjustment (Section 8-8.)

1-20-3. DPR-172/174 Board

Upon completion of replacement and repair of this board, check that the audio and video signals are played back correctly using the cassette tape recorded based on the following digital format.

	Betacam SX	MPEG IMX	Digital Betacam
J-1 : DPR-172 board	○	×	×
J-2 : DPR-174 board	○	○	×
J-3 : DPR-174 board	○	○	○



DR-432 board (Side A)

1-20-4. DR-432 Board

After replacing this board or its NV-RAM :
Perform the servo system adjustment (Section 8-3) and then perform the LTC Playback Level check as described below.

When repairing the motor drive circuit :
Upon completion of repairing the motor drive circuit, perform the servo system adjustment (Section 8-3) and then perform the LTC Playback Level check as described below.

When repairing the S-tension detection circuit :
Upon completion of repairing the S-tension detection circuit, perform the tension regulator adjustment (Section 5-13-2) and then perform the LTC Playback Level check as described below.

Equipment/Tools

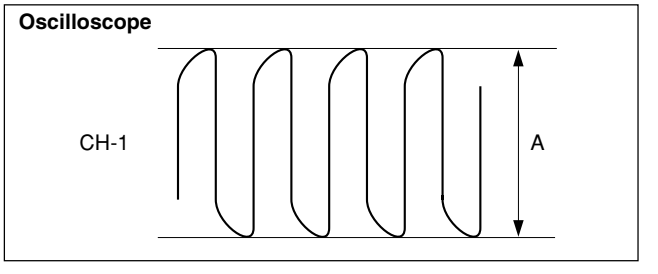
- Oscilloscope : TEKTRONIX TDS460A
- Alignment Tape
  For 525 system : SR5-1 (Part No. 8-960-075-01)
  For 625 system : SR5-1P (Part No. 8-960-075-51)

LTC Playback Level Check

Note

Implement this check using either the 525 system or the 625 system. It is not necessary to implement this check in both of the two systems.

1. Warm up the unit and oscilloscope for ten minutes or more.
2. Connect and set an oscilloscope as follows.
   CH-1: TP101/DR-432 (D-1), DC 10 mV/DIV
   GND : E102/DR-432 (E-1)
   TIME : 100 µs/DIV
3. Insert the alignment tape.
   525 system : SR5-1
   625 system : SR5-1P
4. Check amplitude of the waveform on the oscilloscope when playing back the alignment tape in the following modes.
   Playback mode : PLAY, REW, SHUTTLE × −5 times speed, and SHUTTLE × −0.21 times speed
   Specification : A ≧ 0.8 V p-p



5. Eject the alignment tape.

1-20-5. HP-107 Board

Upon completion of replacement and repair of this board, check that the LEVEL volume control is functioning using the following procedure.

1. Set the LEVEL control to minimum.
2. Connect the headphones to the HEADPHONES jack.
3. Generate a test signal (1 kHz) using C21 : AUDIO/ VIDEO TEST SG in the maintenance mode or ITEM-808 : INTERNAL AUDIO SIGNAL GENERATOR in the setup extended menu. (Refer to Section 1-18-2).
4. Slowly turn the LEVEL control and confirm that sound audible from the headphones varies.

1-20-6. IF-808 Board (J-1/901, J-2/901, and J-3/901)

Upon completion of replacement and repair of this board, implement the following adjustment and check.

1. Perform the video system check. (Refer to Section 8-6.)
2. Perform the audio system adjustment. (Refer to Section 8-5.)

1-20-7. IF-826 Board (J-1/902, J-2/902, and J-3/902)

Upon completion of replacement and repair of this board, implement the following adjustment and check.

1. Perform the video system check. (Refer to Section 8-6.)
2. Perform the audio system adjustment. (Refer to Section 8-5.)
3. Perform the SDI VCO adjustment. (Refer to Section 8-7.)

1-20-8. MB-919 Board

After replacing this board

1. Check that the DIP switch S1600 on the MB-919 board is set as shown below.

Notes

- ■ marks stand the position of knobs.
- For the description of the DIP switch, refer to Section 1-12-3.

Ref. No.	Setting	Remark
S1600		Factory Setting

2. Perform the servo adjustment. (Refer to Section 8-3.)
3. Perform the RF adjustment. (Refer to Section 8-4.)
4. Set the serial number using M31 : SERIAL NUMBER of the maintenance mode. (Refer to Section 3-5-3.)
5. Set the headroom of the audio level meter using M370 : METER HEAD ROOM of the maintenance mode. (Refer to Section 3-5-6.)
6. Perform the 27 MHz VCO adjustment. (Refer to Section 8-6-3.)
7. Set the setup menu again. (Refer to the " Basic Menu" and "Extended Menu" in the Operation Manual.)

After repairing this board (except for NV-RAM replacement) :

1. Perform the servo adjustment. (Refer to Section 8-3.)
2. Perform the RF adjustment. (Refer to Section 8-4.)
3. Perform the 27 MHz VCO adjustment. (Refer to Section 8-6-3.)
4. Perform the SDI VCO adjustment for the unit with IF-826 board (J-1/902, J-2/902, and J-3/902). (Refer to Section 8-7.)

After replacing NV-RAM of RF system

1. Perform the RF adjustment. (Refer to Section 8-4.)

After replacing NV-RAM of System Control

1. Perform the RF adjustment. (Refer to Section 8-4.)
2. Perform the 27 MHz VCO adjustment. (Refer to Section 8-6-3.)
3. Set the serial number using M31 : SERIAL NUMBER of the maintenance mode. (Refer to Section 3-5-3.)
4. Set the headroom of the audio level meter using M370 : METER HEADROOM of the maintenance mode. (Refer to Section 3-5-6.)

1-20-9. SE-604 Board

Upon completion of replacement of this board, implement the tension regulator adjustment. (Refer to Section 5-13-2.)

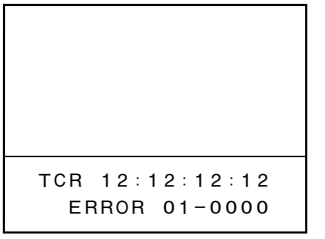
1-20-10. SE-605 Board

Upon completion of replacement and repair of this board, check that the compartment block of the cassette compartment assembly moves up and down correctly using C013 : CASSETTE COMP of the maintenance mode.
(Refer to Section 3-2-2.)

Section 2
Error Message

2-1. Outline of Error Message

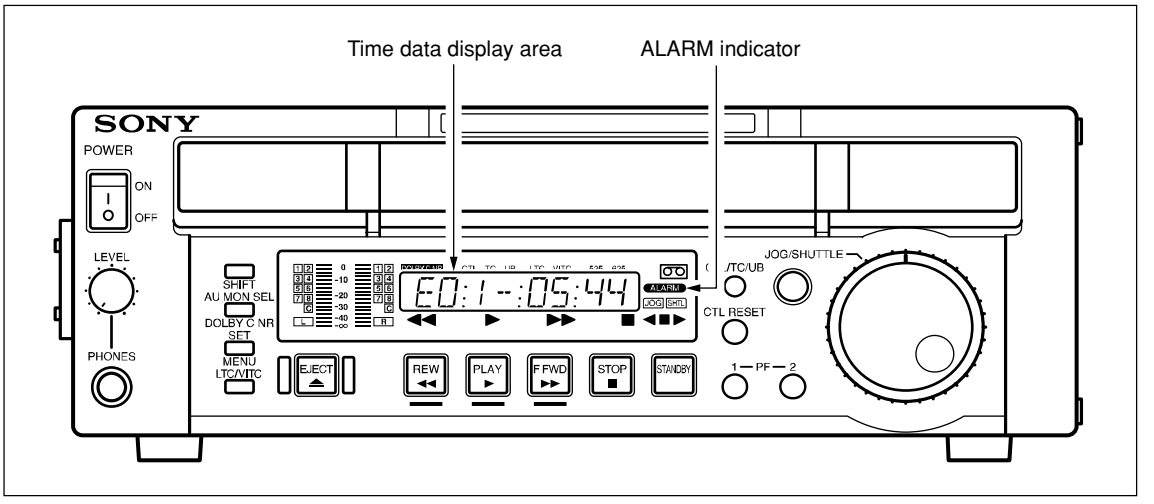
This unit has the self-diagnosis function for the internal problems.
When a problem is detected, the ALARM indicator on the control panel is turned on immediately and the error code is displayed on the time data display area.
At the same time, the error code and sub error code are superimposed on the video monitor that is connected to VIDEO OUTPUT connector with "(SUPER)" on the connector panel.



Example of error code that is superimposed on the video monitor.

Notes

- In order to superimpose error code on the video monitor, set the setup menu ITEM-005 to any positions other than OFF. (For details, refer to "Basic Menu" of the operation manual.)
- The error messages are memorized in the NV-RAM of this unit as the error log. (Refer to Section 3-4 for the error log.)



Time data display area and ALARM indicator

Error List

Code	Message	Page	Description
01	REEL TROUBLE - 1	2-3	“Tape slack” or “Tape breaking” is detected during threading or unthreading.
02	REEL TROUBLE - 2	2-4	“Tape slack”, “Tape breaking”, “S-reel lock or T-reel lock” is detected during search, fast-forward, rewind, or stop.
03	REEL TROUBLE - 3	2-5	“Tape slack”, “Tape breaking” or “S-reel lock or T-reel lock” is detected during playback.
04	REEL TROUBLE - 4	2-6	Abnormal tape running speed is detected during fast-forward or rewind.
05	REEL TROUBLE - 5	2-6	Abnormal operation of the S-reel or T-reel is detected by the diagnosis at the cassette insertion.
06	TAPE TENSION ERROR	2-7	Excessive tape tension is detected during playback.
07	CAPSTAN TROUBLE	2-7	Abnormal operation of the capstan motor is detected.
08	DRUM TROUBLE	2-8	Abnormal operation of the drum motor is detected.
09	FUNC.CAM MOTOR	2-8	Abnormal threading operation or abnormal unthreading operation is detected.
0A	THREADING TROUBLE	2-9	The error that the tape top processing or the tape end processing is not completed, is detected
10	HUMID	2-9	Dew condensation is detected.
11	TAPE TOP/END SENSOR TROUBLE	2-10	Both the tape top and the tape end are detected at the same time.
12	TAPE TOP SENSOR TROUBLE	2-10	Abnormality is detected in tape top sensor.
13	TAPE END SENSOR TROUBLE	2-11	Abnormality is detected in tape end sensor.
20	CASSETTE COMPARTMENT MOTOR LOCK	2-11	Abnormality is detected in the UP or DOWN operation of the cassette compartment.
96	SY NV-RAM ERROR	2-12	Abnormal operation of the NV-RAM (MB-919 board) of the system control is detected.
97	SV NV-RAM ERROR	2-12	Abnormal operation of the NV-RAM (DR-432 board) of the servo system is detected.
98	RF NV-RAM ERROR	2-13	Abnormal operation of the NV-RAM (MB-919 board) of the RF system or NV-RAM (DR-124 board) of the Betacam playback system is detected.
99	INTERNAL INTERFACE ERROR	2-13	Communication error between the SYS CPU (MB-919 board) and MPU (DM-124 or MB-919 board) is detected.

Notes

The errors of the error code 01 to 13 are detected by either one or both of the MB-919 board and DR-432 board.

The error of the error code 20 is detected by the DR-432 board.

The errors of the error code 96 to 99 are detected by of the MB-919 board.

The error codes can be grouped into the two groups of VTR and OTHERS. When errors occur in both groups at the same time, the error message of both groups are switched every two seconds. When two or more errors occur in either group, the error messages are displayed in the following priorized order of the codes.

VTR : 97, 02, 03, 04, 05, 07, 06, 01, 09, 08, 0A, 10, 11, 12, 13, 20

OTHERS : 96, 98, 99

2-2. Details of Error Message

Note

The “Protection mode” that is mentioned in this section is the mode in which the servo control system stops the tape running and stops the drum motor automatically, and stoppage is continued. When the unit enters the “Protection mode” once, the unit cannot recover to the normal operating state automatically. Turn off the main power once and back on without a cassette tape inserted.
If the unit enters the “Protection mode” with a cassette tape inserted, remove the cassette tape manually by referring to Section “1-10. How to Remove Cassette Tape when Tape Slack Occurs.”
If the main power of the unit is turned on without removing a cassette tape, the tape may be damaged.

ERROR-01 REEL TROUBLE-1

Description : “Tape slack” or “Tape breaking” is detected during threading or unthreading.

Detecting conditions :
1) When the S-reel FG signal cannot be detected during threading or unthreading operation after startup.
2) When relationship between the S-reel FG signal and the threading FG signal fails to meet specification in the state other than the above item 1).
3) When the reel tightening operation before threading cannot be completed even after elapse of 10 seconds.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Cassette compartment is defective, or its attachment is defective. (Reel cannot rotate because the cassette position is out of the specified position.)
- S-reel FG wave-shape circuit (DR-432 board) is defective.
- S-reel motor is defective.
- S-reel motor drive circuit (DR-432 board) is defective.
- S-reel brake is defective.
- Reel brake plunger solenoid drive circuit (DR-432 board) is defective.
- Servo adjustment on S-reel is defective.
- Harness has open circuit.
- S-reel table height is defective.

Protective operation : When threading of tape has not started yet after a cassette is inserted, the cassette is ejected. In other states, the unit enters the protection mode.

Note

Be sure to remove the cassette tape manually. (Refer to Section 1-10.)
If the main power of the unit is turned on without removing a cassette tape, the tape may be damaged.

ERROR-02 REEL TROUBLE-2

Description : "Tape slack", "Tape breaking" or "S-reel lock or T-reel lock" is detected during search, fast-forward, rewind, or stop.

Detecting conditions :
1) When the mechanical state that the revolution ratio between S-reel and T-reel is abnormal, has continued for 0.3 seconds or longer.
2) When the mechanical state that the revolution direction of S-reel and T-reel does not match, has continued for 5 seconds or longer.
3) S-reel lock or T-reel lock is detected.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Cassette compartment is defective, or its attachment is defective. (Reel cannot rotate because the cassette is located out of the specified position.)
- S-reel or T-reel FG wave-shape circuit (DR-432 board) is defective.
- S-reel or T-reel motor is defective.
- S-reel or T-reel motor drive circuit (DR-432 board) is defective.
- Capstan motor is defective.
- Capstan motor drive circuit (DR-432 board) is defective.
- Capstan FG wave-shape circuit (DR-432 board) is defective.
- Insufficient tape winding torque during rewind due to defective tension sensor or defective tension detector circuit (DR-432 board).
- Capstan, reel or tension sensor related servo adjustment error.
- Reel brake is defective.
- Reel brake solenoid drive circuit (DR-432 board) is defective.
- Harness has open circuit.
- Reel table height is defective.
- Defective tape path or abnormality in drum.
- Tape has abnormality. (Tape winding status has problem.)

Protective operation : The unit enters the protection mode.
However, the unit can return to the normal state after entering the protection mode once at the tape end and others.

Note

Be sure to remove the cassette tape manually. (Refer to Section 1-10.)
If the main power of the unit is turned on without removing a cassette tape, the tape may be damaged.

ERROR-03 REEL TROUBLE-3

Description : "Tape slack", "Tape breaking" or "S-reel lock or T-reel lock" is detected during playback.

Detecting conditions :
1) When the mechanical state that the revolution ratio between S-reel and T-reel is abnormal, has continued for 0.3 seconds or longer.
2) When the mechanical state that the revolution direction of S-reel and T-reel does not match, has continued for 5 seconds or longer.
3) S-reel lock or T-reel lock is detected.
4) The mechanical state that the tension value that is calculated from the tension sensor is 7g or less, has continued for 3 seconds or longer.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Cassette compartment is defective, or its attachment is defective.
  (Reel cannot rotate because the cassette position is out of the specified position.)
- S-reel or T-reel FG wave-shape circuit (DR-432 board) is defective.
- S-reel or T-reel motor is defective.
- S-reel or T-reel motor drive circuit (DR-432 board) is defective.
- Capstan motor is defective.
- Capstan motor drive circuit (DR-432 board) is defective.
- Capstan FG wave-shape circuit (DR-432 board) is defective.
- Capstan, reel or S-side tension sensor related servo adjustment error.
- Reel brake is defective.
- Reel brake solenoid drive circuit (DR-432 board) is defective.
- Harness has open circuit.
- Reel table height is defective.
- Defective tape path or abnormality in drum.
- Tape has abnormality. (Tape winding status has problem.)

Protective operation : The unit enters the protection mode.

Note

Be sure to remove the cassette tape manually. (Refer to Section 1-10.)
If the main power of the unit is turned on without removing a cassette tape, the tape may be damaged.

ERROR-04 REEL TROUBLE-4

Description : Abnormal tape running speed is detected during fast-forward or rewind.

Detecting conditions : 1) When the mechanical state that the tape speed that is calculated from the S-reel FG and the T-reel FG is less than half of the specified tape speed, has continued for 4 seconds or longer.
2) When the mechanical state that the tape speed that is calculated from the S-reel FG and the T-reel FG is 2 times faster or more of the specified tape speed, has continued for 4 seconds or longer.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Cassette compartment is defective, or its attachment is defective.
  (Reel cannot rotate because the cassette position is out of the specified position.)
- S-reel or T-reel motor is defective.
- S-reel or T-reel FG wave-shape circuit (DR-432 board) is defective.
- S-reel or T-reel motor drive circuit (DR-432 board) is defective.
- S-reel or T-reel related servo adjustment error.
- Reel brake is defective.
- Reel brake solenoid drive circuit (DR-432 board) is defective.
- Harness has open circuit.
- Reel table height is defective.
- Defective tape path or abnormality in drum.
- Tape has abnormality. (Tape winding status has problem.)

Protective operation : Tape stops running and comes to complete stop.

ERROR-05 REEL TROUBLE-5

Description : Abnormal operation of the S-reel or T-reel is detected by the diagnosis at the cassette insertion.

Detecting conditions : 1) When the S-reel FG or T-reel FG cannot be detected.
2) When the number of the S-reel FG or T-reel FG signal is more than the specified value.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected cause :
- Reel sensor inside the S-reel or T-reel motor is defective.
- S-reel or T-reel FG wave-shape circuit (DR-432 board) is defective.
- S-reel or T-reel motor drive circuit (DR-432 board) is defective.
- S-reel or T-reel related servo adjustment error.
- Reel brake is defective.
- Reel brake solenoid drive circuit (DR-432 board) is defective.
- Harness has open circuit.

Protective operation : The cassette is ejected.

ERROR-06 TAPE TENSION ERROR

Description : Excessive tape tension is detected during playback.

Detecting conditions : When the mechanical state that the tension value of the tension sensor is 60 g or more, has continued for 3 seconds or longer.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Cassette compartment is defective, or its attachment is defective.
  (Reel cannot rotate because the cassette position is out of the specified position.)
- Tension sensor or its tension detector circuit (DR-432 board) is defective.
- S-reel motor is defective.
- S-reel motor drive circuit (DR-432 board) is defective.
- S-reel or tension sensor related servo adjustment error.
- Reel brake is defective.
- Reel brake solenoid drive circuit (DR-432 board) is defective.
- Harness has open circuit.

Protective operation : Tape stops running and comes to complete stop.

ERROR-07 CAPSTAN TROUBLE

Description : Abnormal operation of the capstan motor is detected.

Detecting conditions :
1) When the number of capstan FG is outside the specified range at the cassette insertion.
2) When the frequency that is calculated from the capstan FG is outside the specifications.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Capstan motor is defective.
- FG sensor inside the capstan is defective.
- Capstan motor drive circuit (DR-432 board) is defective.
- Capstan FG wave-shape circuit (DR-432 board) is defective.
- Capstan FG duty ratio adjustment error.

Protective operation : In the case of detecting condition 1) : The cassette is ejected.
In the case of detecting condition 2) : Tape stops running and comes to complete stop.

ERROR-08 DRUM TROUBLE

Description : Abnormal operation of the drum motor is detected.

Detecting condition : When the mechanical state that the drum FG cycle is deviated from the normal value during the normal rotation by 30% or more, has continued for 30 seconds or longer.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Drum motor is defective.
- SV CPU (IC1601/MB-919 board) is defective.
- Drum motor drive circuit (DR-432 board) is defective.
- Drum FG/PG wave-shape circuit (IC502/DR-432 board) is defective.
- Re-assembling of the upper drum at replacement is defective.

Protective operation : Tape stops running and comes to stop at the unthreaded end.

ERROR-09 FUNC. CAM MOTOR

Description : Abnormal threading operation or abnormal unthreading operation is detected.

Detecting conditions :
1) When the threading/unthreading operation does not complete after elapse of about 10 seconds from the start of the operation.
2) When the threading FG signal is not output within about 1.5 seconds when the threading motor is driven.
3) When the status transition of the function cam sensor is abnormal.
4) When the pinch plunger solenoid does not complete its operation even 8 seconds have elapsed after start of the operation.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Function cam (position) sensor (DR-432 board) is defective.
- Function cam (position) sensor input port (IC1601/MB-919 board) is defective.
- Threading motor is defective.
- Threading FG sensor (DR-432 board) is defective.
- Threading motor drive circuit (IC400/DR-432 board) is defective.
- Threading mechanism is defective.

Protective operation : The unit enters the protection mode.

Note

Be sure to remove the cassette tape manually. (Refer to Section 1-10.)
If the main power of the unit is turned on without removing a cassette tape, the tape may be damaged.

ERROR-0A THREADING TROUBLE

Description : The error that the tape top processing or the tape end processing is not completed, is detected

Detecting conditions : 1) When tape top is detected again after the tape top processing is already completed.
2) When tape end is detected again after the tape end processing is already completed.

Tape top processing

When tape top is detected during threading, tape is unthreaded and is advanced a little without drawing the tape out. This mechanical operation (short FF) is called tape top processing.

Tape end processing

When tape end is detected during threading, tape is unthreaded and is advanced a little without drawing the tape out. This mechanical operation (short REW) is called tape end processing.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- S/T-reel motor is defective.
- S/T-reel related servo adjustment error.
- S/T-reel motor drive circuit (DR-432 board) is defective.
- Tape top sensor or tape end sensor is defective.
- Tape top or tape end detector circuit (IC607/DR-432 board) is defective.
- Tape top or tape end input port (IC1601/MB-919 board) is defective.
- Tape has abnormality.

Protective operation : The unit stops at the unthreaded end.

ERROR-10 HUMID

Description : Dew condensation is detected.

Detecting condition : When the dew sensor has detected the dew condensation for about 2 seconds continuously.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Dew condensation is detected actually. (In such a case that the operating environment is changed from low to high temperature and high humidity sharply.)
- Dew sensor is defective.
- Dew input port (IC404/DR-432 board) is defective.

Protective operation : The cassette is ejected.
Operation of the cleaning roller is inhibited.
After cassette is ejected, re-insertion of a cassette is inhibited while the message is being displayed. After the specified time has elapsed since the dew detection is no more detected, the message disappears automatically.

ERROR-11 TAPE TOP/END SENSOR TROUBLE

Description : Both the tape top and the tape end are detected at the same time.

Detecting condition : When the mechanical state that both the tape end and tape top are detected at the same time, has continued 7 seconds or longer.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Tape top sensor or tape end sensor is defective.
- Tape top or tape end detector circuit (IC607/DR-432 board) is defective.
- Tape top or tape end input port (IC1601/MB-919 board) is defective.
- Harness has open circuit or defective contact of connector.

Protective operation : When the trouble occurs while tape is running, tape stops running and comes to stop.

ERROR-12 TAPE TOP SENSOR TROUBLE

Description : Abnormality is detected in tape top sensor.

Detecting conditions :
1) When the mechanical state that the tape top is detected, has continued 7 seconds or longer.
2) When the tape top is detected at the mechanical state that the tape top position can never be detected.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Tape top sensor is defective.
- Tape top detector circuit (IC607/DR-432 board) is defective.
- Tape top input port (IC1601/MB-919 board) is defective.
- Harness has open circuit or defective contact of connector.
- Unit is in the state that the tape cannot be moved actually at the tape top due to troubles other than tape sensor.

Protective operation : When the trouble occurs while tape is running, tape stops running and comes to stop.

ERROR-13 TAPE END SENSOR TROUBLE

Description : Abnormality is detected in tape end sensor.

Detecting conditions : 1) When the mechanical state that the tape end is detected, has continued 7 seconds or longer.
2) When the tape end is detected at the mechanical state that the tape end position can never be detected.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Tape end sensor is defective.
- Tape end detector circuit (IC607/DR-432 board) is defective.
- Tape end input port (IC1601/MB-919 board) is defective.
- Harness has open circuit or defective contact of connector.
- Unit is in the state that the tape cannot be moved actually at the tape end due to troubles other than tape sensor.

Protective operation : When the trouble occurs while tape is running, tape stops running and comes to stop.

ERROR-20 CASSETTE COMPARTMENT MOTOR LOCK

Description : Abnormality is detected in the UP or DOWN operation of the cassette compartment.

Detecting conditions : 1) When the above operation is not completed after elapse of about 4 seconds after the start of the operation.
2) When an abnormality is detected in the cassette compartment sensor.

Sub error code : Displayed. (Refer to Section 2-3.)

Suspected causes :
- Cassette compartment block is defective.
- Cassette compartment motor drive circuit (DR-432 board) is defective.
- Cassette down sensor (SE-605 board) is defective.
- Cassette down input port (IC1601/MB-919 board) is defective.

Protective operation : The unit enters the protection mode.

Note

Be sure to remove the cassette tape manually. (Refer to Section 1-10.)
If the main power of the unit is turned on without removing a cassette tape, the tape may be damaged.

ERROR-96 SY NV-RAM ERROR

Description : Abnormal operation of the NV-RAM (MB-919 board) of the system control is detected.

Detecting condition : When data error has occurred during data read/write of the NV-RAM.

Sub error code : None (0000 is displayed)

Suspected cause : NV-RAM (IC1503/MB-919 board) is defective.

Note

Contents of the NV-RAM data contain the SETUP menu data and others. Refer to Section 1-14 for details.

Protective operation : When the error occurs with the data of the SETUP MENU, the data is reset to the default setting when shipped from the factory.

ERROR-97 SV NV-RAM ERROR

Description : Abnormal operation of the NV-RAM (DR-432 board) of the servo system is detected.

Detecting condition : When checksum of the NV-RAM data does not agree.

Sub error code : None (0000 is displayed)

Suspected cause : NV-RAM (IC301/DR-432 board) is defective.

Protective operation : The unit enters the protection mode.

ERROR-98 RF NV-RAM ERROR

Description: Abnormal operation of the NV-RAM (MB-919 board) of the RF system or NV-RAM (DM-124 board) of the Betacam playback system is detected.

Detecting conditions :
EQ : When data error has occurred during data read/write of the NV-RAM (IC1402/MB-919 board) of the RF system.
DM : When data error has occurred during data read/write of the NV-RAM (IC1805/DM-124 board) of the Betacam playback system.

Sub error codes :
- 0E00 (EQ)
- 0F00 (DM)

Suspected causes :
EQ : NV-RAM (IC1402/MB-919 board) of the RF system is defective.
DM : NV-RAM (IC1805/DM-124 board) of the Betacam playback system is defective.

Protective operation : None

ERROR-99 INTERNAL INTERFACE ERROR

Description : Communication error between the SYS CPU (IC1601/MB-919 board) and MPU (MB-919 or DM-124 board) is detected.

Detecting conditions :
EQ : When communication with MPU (IC1408/MB-919 board) has abnormality.
DM : When communication with MPU (IC908/DM-124 board) has abnormality.

Sub error codes :
- 0E00 (EQ)
- 0F00 (DM)

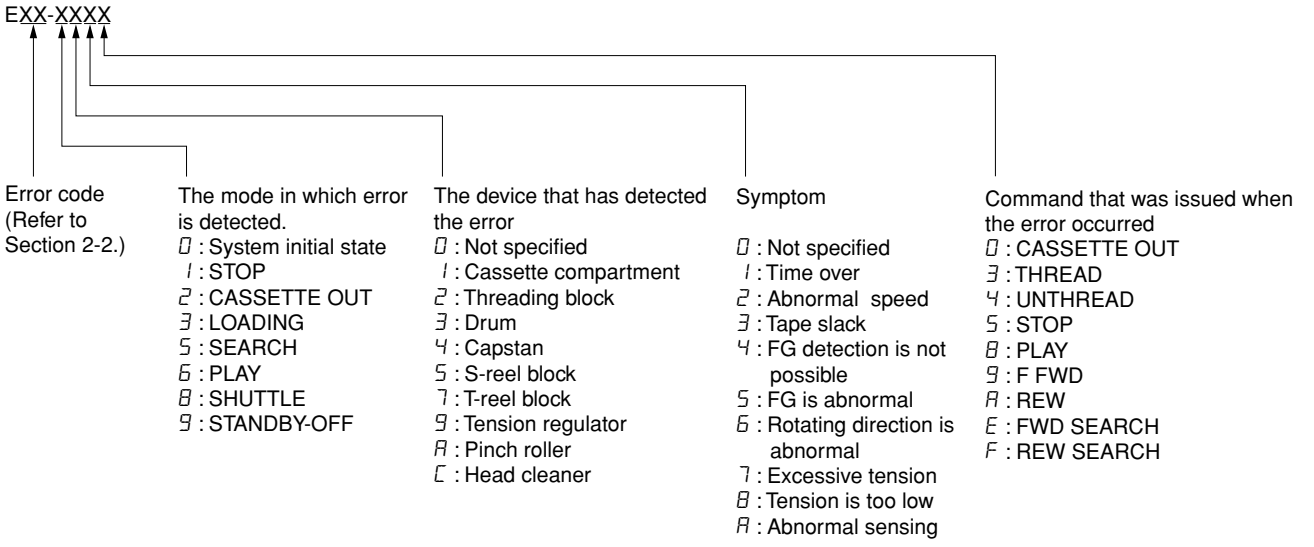
Suspected causes :
EQ : Communication with MPU (IC1408/MB-919 board) has abnormality.
DM :
- Interface buffer (IC904, IC906) of the DM-124 board is defective.
- Communication with MPU (IC908/DM-124 board) has abnormality.

Protective operation : None

2-3. On Sub Error Code

2-3-1. Description of Sub Error Code

This section describes sub error codes of ERROR-0X, ERROR-1X and ERROR-2X.


EXX-XXXX
Error code (Refer to Section 2-2.)
The mode in which error is detected.
0 : System initial state
1 : STOP
2 : CASSETTE OUT
3 : LOADING
5 : SEARCH
6 : PLAY
8 : SHUTTLE
9 : STANDBY-OFF
The device that has detected the error
0 : Not specified
1 : Cassette compartment
2 : Threading block
3 : Drum
4 : Capstan
5 : S-reel block
7 : T-reel block
9 : Tension regulator
A : Pinch roller
C : Head cleaner
Symptom
0 : Not specified
1 : Time over
2 : Abnormal speed
3 : Tape slack
4 : FG detection is not possible
5 : FG is abnormal
6 : Rotating direction is abnormal
7 : Excessive tension
8 : Tension is too low
A : Abnormal sensing
Command that was issued when the error occurred
0 : CASSETTE OUT
3 : THREAD
4 : UNTHREAD
5 : STOP
8 : PLAY
9 : F FWD
A : REW
E : FWD SEARCH
F : REW SEARCH

Error List

Error code	Error name	Device that has detected the error	Symptom	Description
ERROR-01	REEL TROUBLE-1	5	4	The S-reel FG signal could not be detected during unthreading immediately after startup.
		5	3	Tape slack id detected during unthreading.
		0	1	Tape tightening motion before starting unthreading has not ended normally.
ERROR-02	REEL TROUBLE-2	0	2	Rotation ratio of the S-reel versus T-reel is abnormal during SEARCH or SHUTTLE mode.
		0	6	The status that rotating directions of the S-reel and the T-reel do not match, has lasted long during SEARCH or SHUTTLE mode.
		0	7	Excessive tape tension due to reel lock is detected while tape is running with pinch roller being pressed against capstan in the modes other than the PLAY mode.
		0	3	Tape slack due to reel lock is detected while tape is running with pinch roller being pressed against capstan in the modes other than the PLAY mode.
		5	4	S-reel lock is detected during FULL TOP processing or the FULL END processing.
		7	4	T-reel lock is detected during FULL TOP processing or the FULL END processing.

Error code	Error name	Device that has detected the error	Symptom	Description
ERROR-03	REEL TROUBLE-3	0	2	Rotation ratio of the S-reel versus T-reel is abnormal during the PLAY mode.
		0	6	The status that rotating directions of the S-reel and the T-reel do not match, has lasted long during the PLAY mode.
		0	7	Excessive tape tension due to reel lock is detected while tape is running with pinch roller being pressed against capstan during the PLAY mode.
		0	3	Tape slack due to reel lock is detected while tape is running with pinch roller being pressed against capstan during the PLAY mode.
		9	8	Too low tension is detected from the S-side tension sensor output during the PLAY mode.
ERROR-04	REEL TROUBLE-4	5	2	S-reel speed is abnormal.
		7	2	T-reel speed is abnormal.
ERROR-05	REEL TROUBLE-5	5	5	S-reel FG is abnormal at the reel check when cassette is inserted.
		7	5	T-reel FG is abnormal at the reel check when cassette is inserted.
ERROR-06	TAPE TENSION ERROR	9	7	Excessive tension is detected from the S-side tension sensor output during the PLAY mode.
ERROR-07	CAPSTAN	4	5	The capstan FG is abnormal during the capstan check at the cassette insertion.
		4	2	Capstan speed is abnormal.
ERROR-08	DRUM TROUBLE	3	2	Drum rotation speed is abnormal.
ERROR-09	FUNC.CAM MOTOR	2	1	Threading or unthreading operation has not ended after elapse of certain time.
		2	4	Thread FG is not detected after the threading motor drive has started.
		2	A	Function cam sensor output is abnormal.
		A	1	Pinch-on/-off operation has not ended after elapse of certain time.
		C	1	Head cleaning operation has not ended after elapse of certain time.
ERROR-0A	THREADING TROUBLE	2	0	Tape top is detected after tape top processing is completed. Or tape end is detected after tape end processing is completed.
ERROR-10	HUMID	0	0	Dew condensation is detected.
ERROR-11	TAPE TOP/END SENSOR TROUBLE	0	A	Both the tape top and tape end are detected at the same time.
ERROR-12	TAPE TOP SENSOR TROUBLE	0	A	Abnormality is detected in tape top sensor.
ERROR-13	TAPE END SENSOR TROUBLE	0	A	Abnormality is detected in tape end sensor.
ERROR-20	CASSETTE COMPARTMENT MOTOR LOCK	1	1	Cassette compartment UP operation or its DOWN operation has not ended after elapse of certain time.
		1	A	Abnormality is detected in cassette compartment sensor.

Section 3
Maintenance Mode

3-1. Introduction

The maintenance mode of the unit is for maintenance and diagnosis. It consists of the four modes as follows.
Contents of the four maintenance modes are superimposed on the monitor that is connected to the VIDEO OUTPUT COMPOSITE (SUPER) connector.

Note

While the maintenance mode is being executed, setting of the setup extension menu ITEM-501 : STILL TIMER becomes invalid.

```
     MAINTENANCE MODE

*M0  :  CHECK MODE
 M1  :  ADJUST MODE
 M2  :  ERROR LOGGER
 M3  :  OTHERS MODE
```

(Video monitor display when the maintenance mode starts up)

M0 : CHECK MODE ..... (Refer to Section 3-2.)

This is the mode to check the machine.

```
        CHECK MODE

*C0  :  SERVO CHECK
 C1  :  RF CHECK
 C2  :  AUDIO/VIDEO CHECK
 C3  :  BETACAM PB CHECK
```

M1 : ADJUST MODE ..... (Refer to Section 3-3.)

This is the adjustment mode of the machine.

```
        ADJUST MODE

*A0  :  SERVO ADJUST
 A1  :  RF ADJUST
 A2  :  AUDIO/VIDEO ADJUST
 A3  :  BETACAM DM ADJUST
 A4  :  BETACAM TBC ADJUST
 A5  :  MECHANISM ADJUST
 A8  :  Tele-File ADJUST
```

M2 : ERROR LOGGER ..... (Refer to Section 3-4.)

This is the mode for displaying the error record (error log) that occurs in the machine.

```
        ERROR LOGGER
          (01/03)
*01  E01-0000  00:01:02:03
 02  E06-0000  01:02:03:04
 03  E99-0000  20:10:00:20
```

Note

An example of display is displayed in the left.

M3 : OTHERS MODE ..... (Refer to Section 3-5.)

This is the mode for confirming, verifying and other purposes.

```
        OTHERS MODE

*M30 : ROM VERSION
 M31 : SERIAL NUMBER
 M32 : RS-232C CONFIG
 M36 : HOUR METER RESET
 M37 : AUDIO CONFIG
 M3A : ALL SETUP RESET
```

Identifying Buttons, etc.

This machine has the following main buttons and others that are related to the operations of the maintenance mode. The normal functions and usage of these buttons and others are explained below.

① Time data display block
The menu (mode) No., the menu title, selection item, status, or data are displayed here.
Some menus (modes) cannot show the enough information on the time data display block only. Because the messages that are superimposed on the video monitor display are sometimes more convenient for operation and confirmation, use the video monitor for normal operation.

② JOG dial
Rotate the JOG dial to specify the desired menu (mode) or selection item. As the JOG dial is rotated, the asterisk (∗) mark moves on the video monitor. The displays are switched on the time data display block as the JOG dial is rotated.
When the manual adjustment menu or setup selection menu is selected, the data value and setup can be changed by rotating the JOG dial while pressing the ④ JOG/SHUTTLE button.

③ SHUTTLE ring
This operation is the same as that of the ② JOG dial.

④ JOG/SHUTTLE button
The setup value of the selected menu item can be changed by rotating the ② JOG dial (or ③ SHUTTLE ring) while pressing this button.

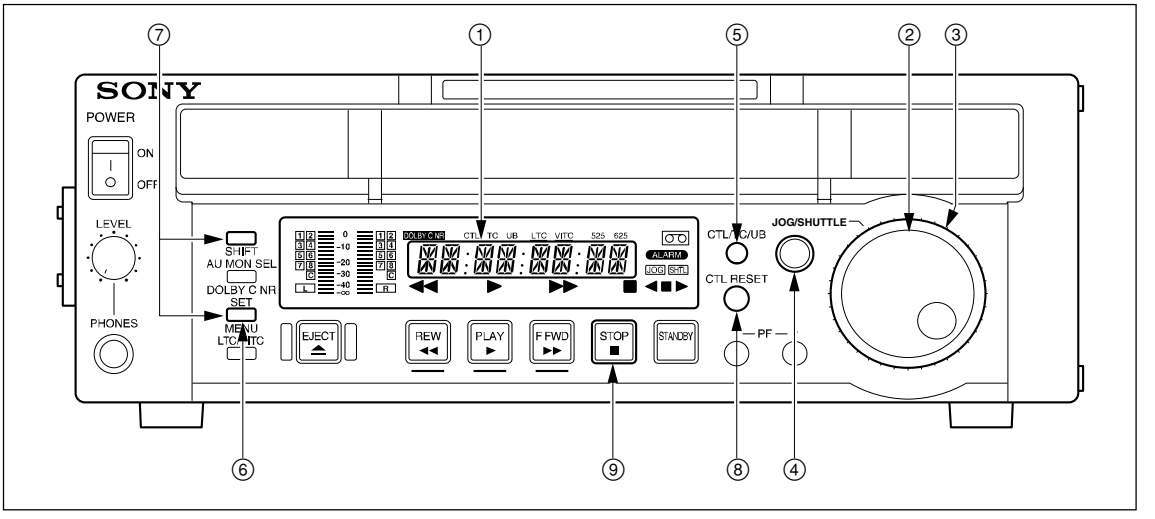
⑤ CTL/TC/UB button
The maintenance mode can be started up by pressing the ⑥ SET button while pressing the CTL/TC/UB button with the setup menu being displayed on the ① time data display block.

⑥ SET button
The maintenance mode can be started up by pressing the SET button while pressing the ⑤ CTL/TC/UB button with the setup menu being displayed on the ① time data display block.
When the machine has already entered in the maintenance mode, the menu (mode) that is selected by the ② JOG dial (or ③ SHUTTLE ring) can be executed by pressing the SET button.

⑦ MENU button (SHIFT + SET)
When the machine has already entered in the maintenance mode, the display can be returned to the previous display (status) by pressing the MENU button while pressing the SHIFT button. If the MENU button is pressed while the mode menu is being displayed (i.e., while the mode No. M0, M1, M2, or M3 is being displayed in the time data display block), the maintenance mode is terminated.

⑧ RESET button
Press the RESET button when you want to erase the recorded error log in the error logger mode.

⑨ STOP button
The data value of the electronic volume controls can be displayed only during the period when the STOP button is press in the automatic RF system alignment mode (A1 : RF ADJUST).

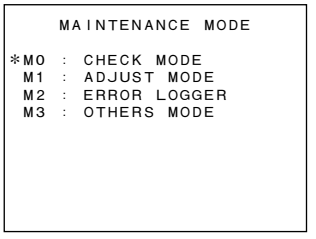


Control panel

How to Start Up the Maintenance Mode

Check that a video monitor is connected with the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.

1. Press the ⑦ MENU (SHIFT + SET) button to show the setup menu on the ① time data display block.
2. While pressing the ⑤ CTL/TC/UB button, press the ⑥ SET button.
3. The mode display of the maintenance mode appears on the video monitor.
   The message “M0-CHECK” appears on the ① time data display block.



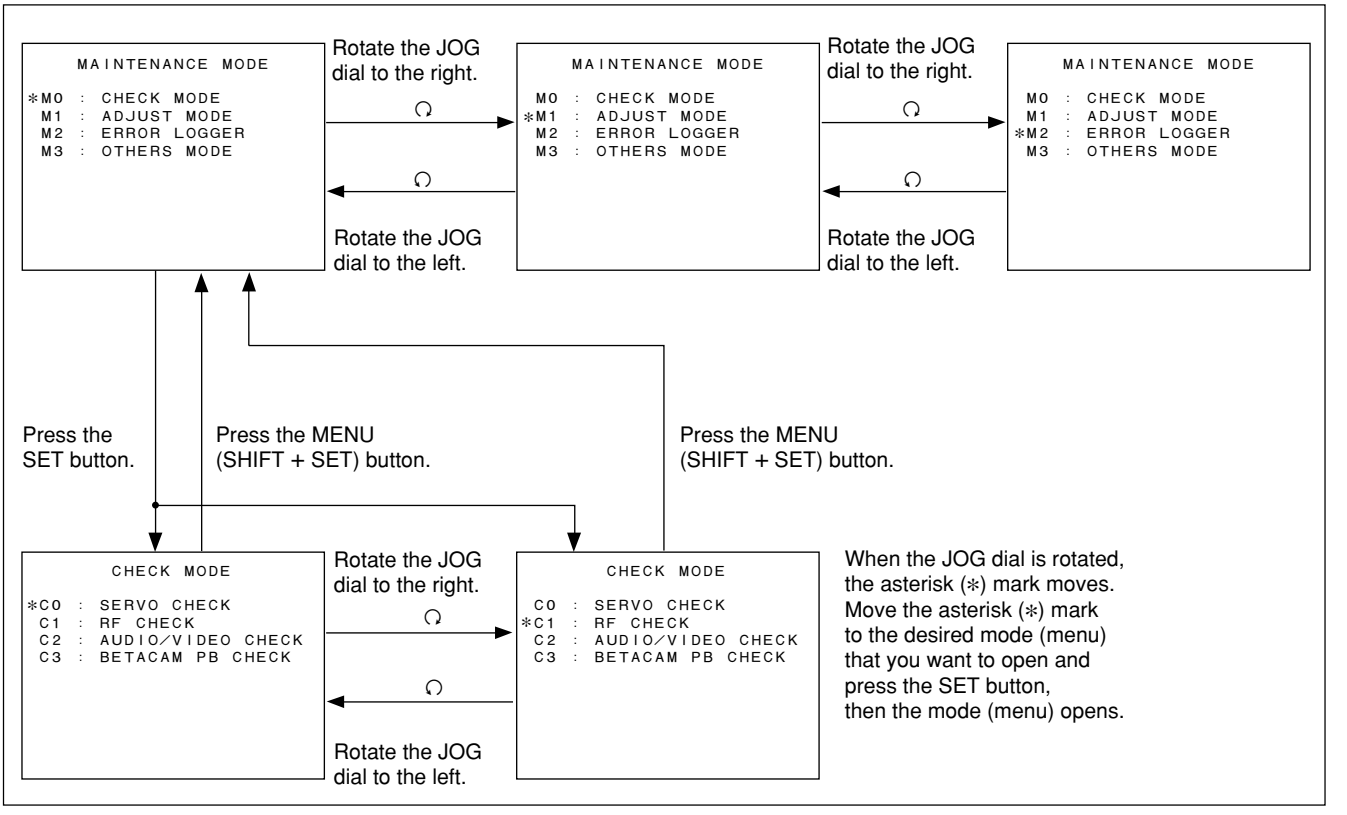
Video monitor

How to Exit the Maintenance Mode

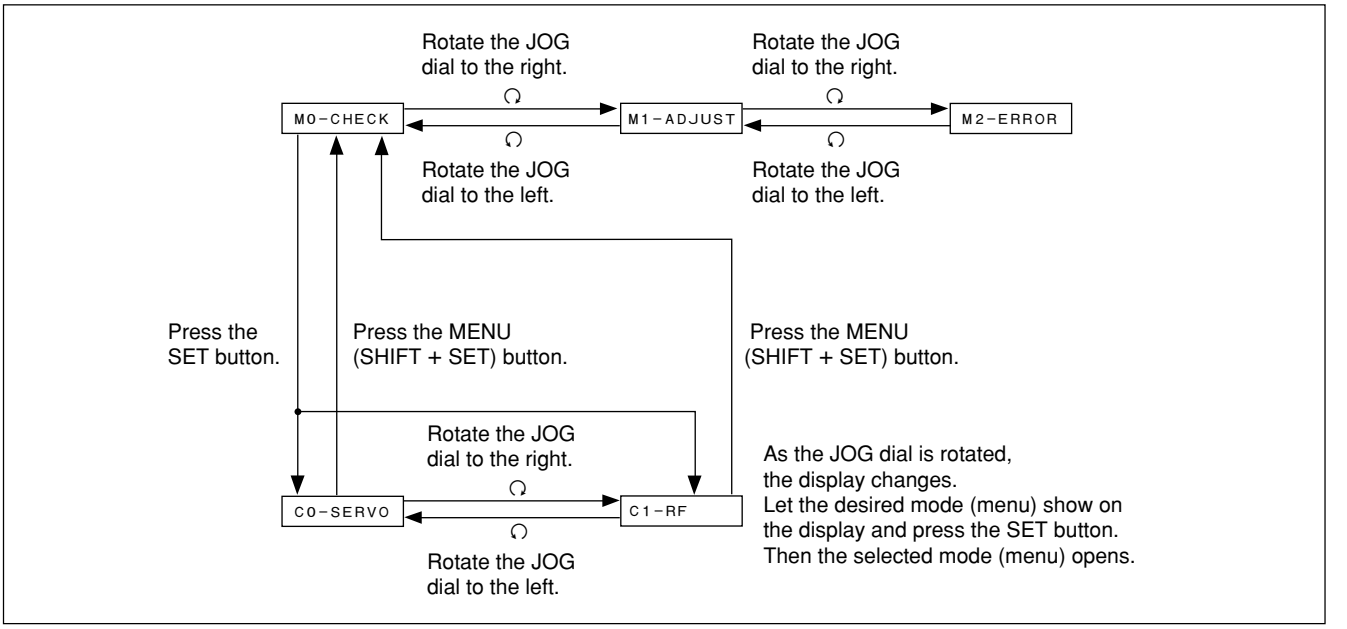
Press the ⑦ MENU (SHIFT + SET) button several times until either CTL count data or time code is displayed on the video monitor.

How to Specify the Menu (Mode) and Item

The method to specify the menu (mode) and item using the JOG dial is explained taking the mode selection as an example. (The SHUTTLE ring can be used instead of the JOG dial to perform the same operation.)


MAINTENANCE MODE
*M0 : CHECK MODE
M1 : ADJUST MODE
M2 : ERROR LOGGER
M3 : OTHERS MODE
Rotate the JOG dial to the right.
Rotate the JOG dial to the left.
MAINTENANCE MODE
M0 : CHECK MODE
*M1 : ADJUST MODE
M2 : ERROR LOGGER
M3 : OTHERS MODE
Rotate the JOG dial to the right.
Rotate the JOG dial to the left.
MAINTENANCE MODE
M0 : CHECK MODE
M1 : ADJUST MODE
*M2 : ERROR LOGGER
M3 : OTHERS MODE
Press the SET button.
Press the MENU (SHIFT + SET) button.
Press the MENU (SHIFT + SET) button.
CHECK MODE
*C0 : SERVO CHECK
C1 : RF CHECK
C2 : AUDIO/VIDEO CHECK
C3 : BETACAM PB CHECK
Rotate the JOG dial to the right.
Rotate the JOG dial to the left.
CHECK MODE
C0 : SERVO CHECK
*C1 : RF CHECK
C2 : AUDIO/VIDEO CHECK
C3 : BETACAM PB CHECK
When the JOG dial is rotated, the asterisk (*) mark moves. Move the asterisk (*) mark to the desired mode (menu) that you want to open and press the SET button, then the mode (menu) opens.

Video monitor display (Superimposed display)

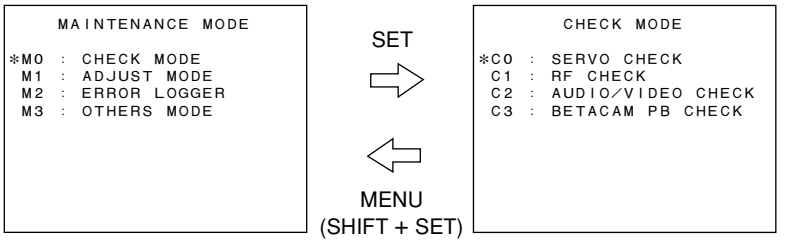

Rotate the JOG dial to the right.
Rotate the JOG dial to the right.
M0-CHECK
M1-ADJUST
M2-ERROR
Rotate the JOG dial to the left.
Rotate the JOG dial to the left.
Press the SET button.
Press the MENU (SHIFT + SET) button.
Press the MENU (SHIFT + SET) button.
Rotate the JOG dial to the right.
C0-SERVO
C1-RF
Rotate the JOG dial to the left.
As the JOG dial is rotated, the display changes. Let the desired mode (menu) show on the display and press the SET button. Then the selected mode (menu) opens.

Menu display block

3-2. CHECK Mode (M0)

3-2-1. Overview

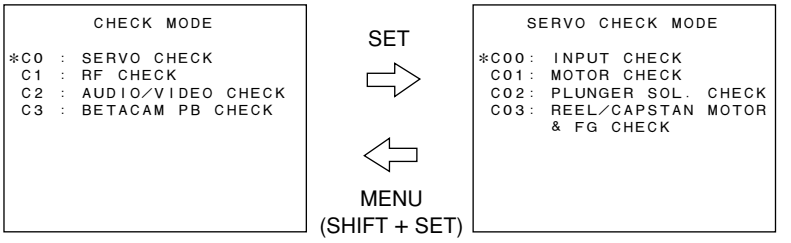
M0 : CHECK MODE
This is the mode to check the machine.



MAINTENANCE mode **CHECK mode**

C0 : SERVO CHECK

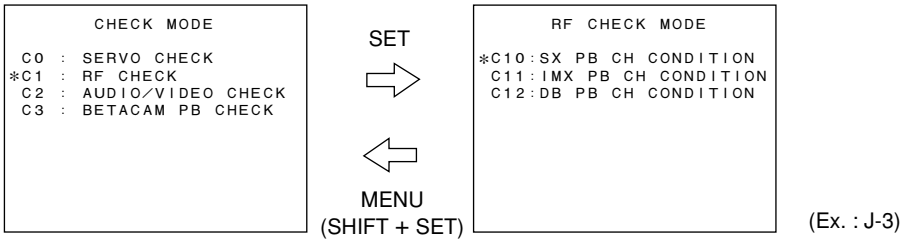
This is the mode to check the servo system.
For details, refer to Section 3-2-2 (page 3-8).



Title		Page	Description
C00 :	INPUT CHECK	–	Sensor check mode
	C000 : CASSETTE SW	3-9	Cassette tab/cassette size sensor check
	C001 : CASSETTE COMP. SW	3-10	Cassette-in sensor check
	C002 : TOP/END SENSOR	3-11	Tape top/tape end sensor check
	C003 : DEW SENSOR	3-12	Dew detection sensor check
C01 :	MOTOR CHECK	–	Motor and several sensors check mode
	C010 : S REEL MOTOR	3-13	S-reel motor check
	C011 : T REEL MOTOR	3-13	T-reel motor check
	C012 : THREADING MOTOR	3-14	Threading motor and function cam sensor check
	C013 : CASSETTE COMP.	3-15	Cassette compartment motor and cassette compartment sensor check
	C014 : CAPSTAN MOTOR	3-17	Capstan motor check
	C015 : DRUM MOTOR	3-18	Drum motor check
C02 :	PLUNGER SOL. CHECK	–	Solenoid check mode
	C020 : REEL BRAKE	3-19	Reel brake solenoid check
C03 :	REEL/CAPSTAN MOTOR & FG Check	3-20	Mode in which a series of reel motor check and capstan motor check are performed.

C1 : RF CHECK

This is the mode to check the RF system.
For details, refer to Section 3-2-3 (page 3-21).



(Ex. : J-3)

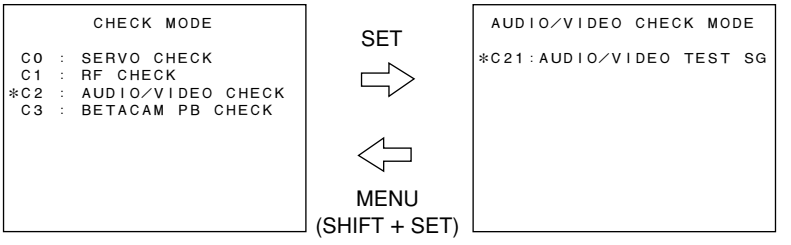
Title	Page	Description
C10 : SX PB CH CONDITION	3-21	Error condition check of each playback head during playback of the Betacam SX format
C11 : IMX PB CH CONDITION	3-25	(Displayed only in the models that have the MPEG IMX playback function) Error condition check of each playback head during playback of the MPEG IMX format
C12 : DB PB CH CONDITION	3-28	(Displayed only in the models that have the digital Betacam playback function) Error condition check of each playback head during playback of the digital Betacam format

Notes

- In the J-1, C11 : IMX RF CHECK and C12 : DB RF CHECK are not displayed.
- In the J-2, C12 : DB RF CHECK is not displayed.

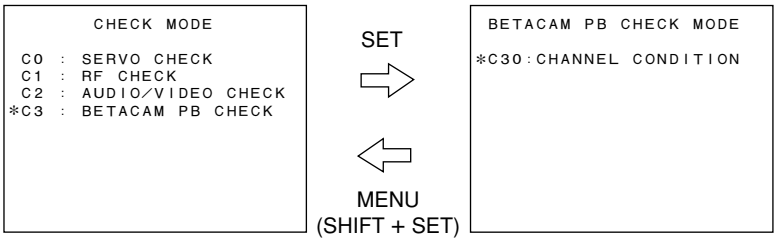
C2 : AUDIO/VIDEO CHECK

This is the mode to check the audio system and video system.
For details, refer to Section 3-2-4 (page 3-31).



Title	Page	Description
C21 : AUDIO/VIDEO TEST SG	3-31	Sets the audio and video test signal generator that is built in the unit.

C3 : BETACAM PB CHECK

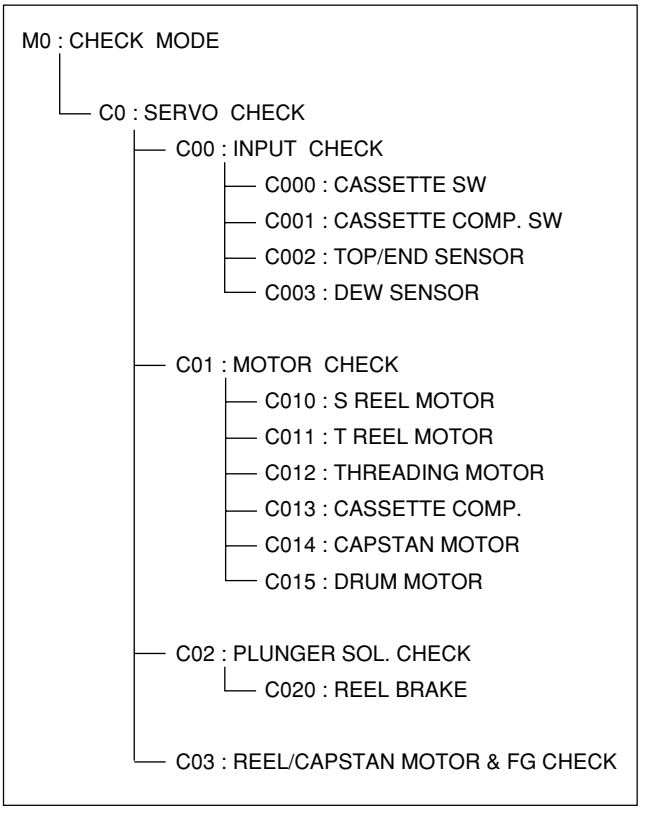


This is the mode to check the playback system of the Betacam and Betacam SP formats.
For details, refer to Section 3-2-5 (page 3-32).

Title	Page	Description
C30 : CHANNEL CONDITION	3-32	Checks the RF level condition of each video channel (Y and C) during playback of the Betacam or Betacam SP formats.

3-2-2. SERVO CHECK Mode (C0)

C0 : SERVO CHECK
This is the mode to check the servo system.


M0 : CHECK MODE
C0 : SERVO CHECK
C00 : INPUT CHECK
C000 : CASSETTE SW
C001 : CASSETTE COMP. SW
C002 : TOP/END SENSOR
C003 : DEW SENSOR
C01 : MOTOR CHECK
C010 : S REEL MOTOR
C011 : T REEL MOTOR
C012 : THREADING MOTOR
C013 : CASSETTE COMP.
C014 : CAPSTAN MOTOR
C015 : DRUM MOTOR
C02 : PLUNGER SOL. CHECK
C020 : REEL BRAKE
C03 : REEL/CAPSTAN MOTOR & FG CHECK

Menu tree of the SERVO CHECK mode

Note

When a machine enters the C0 mode, the cassette tape is automatically ejected if the cassette tape is inserted in the unit.

C00 : INPUT CHECK

This is the mode to check the functions of various sensors.

C01 : MOTOR CHECK

This is the mode to check the functions of various motors and their related sensors.

C02 : PLUNGER SOL. CHECK

This is the mode to check function of solenoid.

C03 : REEL/CAPSTAN MOTOR & FG CHECK

This is the mode to check the S/T reel motors and capstan motor.

C000 : CASSETTE SW

This is the menu to check the functions of the cassette tab sensor (ID-1 to ID-6) and cassette size sensor (ID-7).

```
   SERVO CHECK MODE
C000:CASSETTE SW

 1:REEL HUB   2:METAL/OX
 3:THICKNESS  4:SPARE
 5:SPARE      6:DGTL/ANLG
 7:LARGE CAS

                  1 3 7
 SW 7654321       425
    0000000        6
```

(1) Press the respective sensors (switches) with finger.
- Check that the number "0" under the corresponding switch ID number changes to "1".

(2) Release the fingers.
- Check that the number "1" under the corresponding switch ID number changes to "0".

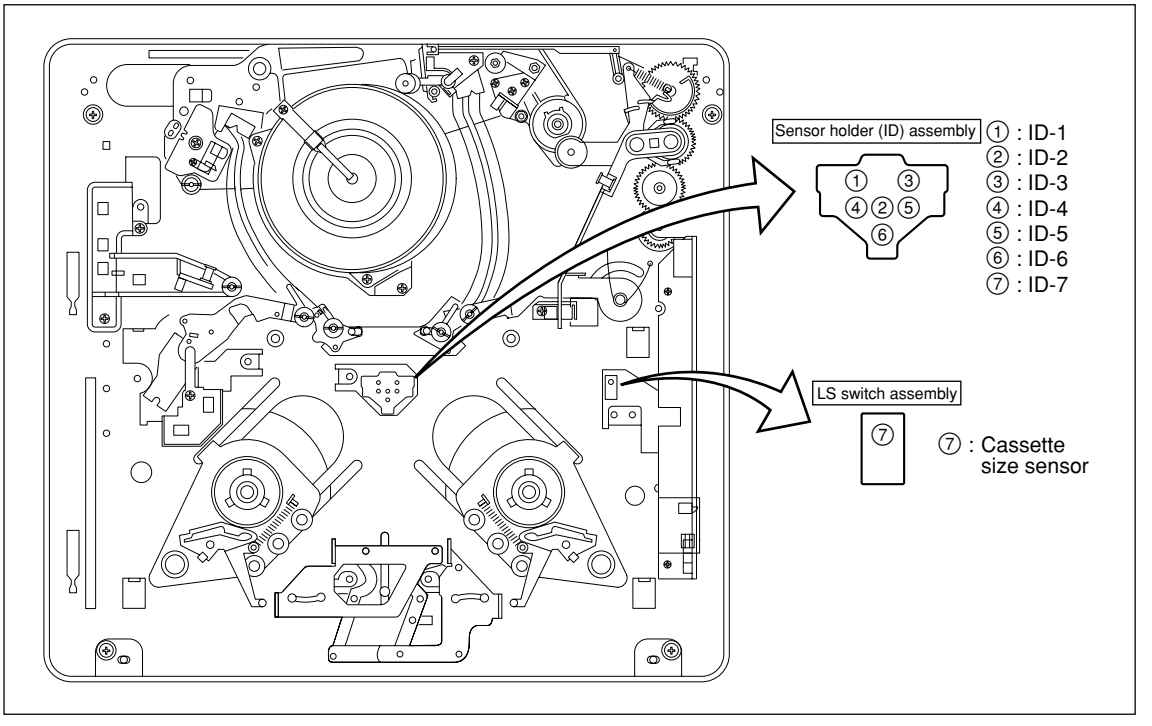
(Example : When the switch ⑥ is pressed)

```
   SERVO CHECK MODE
C000:CASSETTE SW

 1:REEL HUB   2:METAL/OX
 3:THICKNESS  4:SPARE
 5:SPARE      6:DGTL/ANLG
 7:LARGE CAS

                  1 3 7
 SW 7654321       425
    0100000        6
```

(3) Press the MENU (SHIFT + SET) button to terminate the check.

When result of the check shows any fault

If either one of ① to ⑦ of the sensors is faulty
- Check the corresponding sensor on the DR-432 board.
- Check the sensor input port (IC1601 on the MB-919 board) of the MPU.



Sensor (location of switch)

C001 : CASSETTE COMP. SW

This is the menu to check function of the cassette-in sensor.

```
   SERVO CHECK MODE
C001:CASSETTE COMP. SW

 CASSETTE IN SW

   OFF
```

(1) Push up the cassette door toward inside with fingers.

(2) Press both right and left switches in the cassette compartment simultaneously with finger in the direction of the arrow, and check that the display corresponding to the switch changes from “OFF” to “ON”.
(Both switches are interlocked with the sensors.)

(Example)

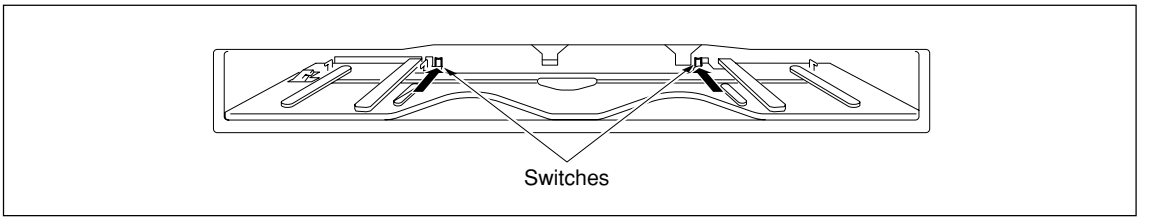
```
   SERVO CHECK MODE
C001:CASSETTE COMP. SW

 CASSETTE IN SW

   ON!
```

(3) Release the fingers and check that the display returns to the original “OFF”.

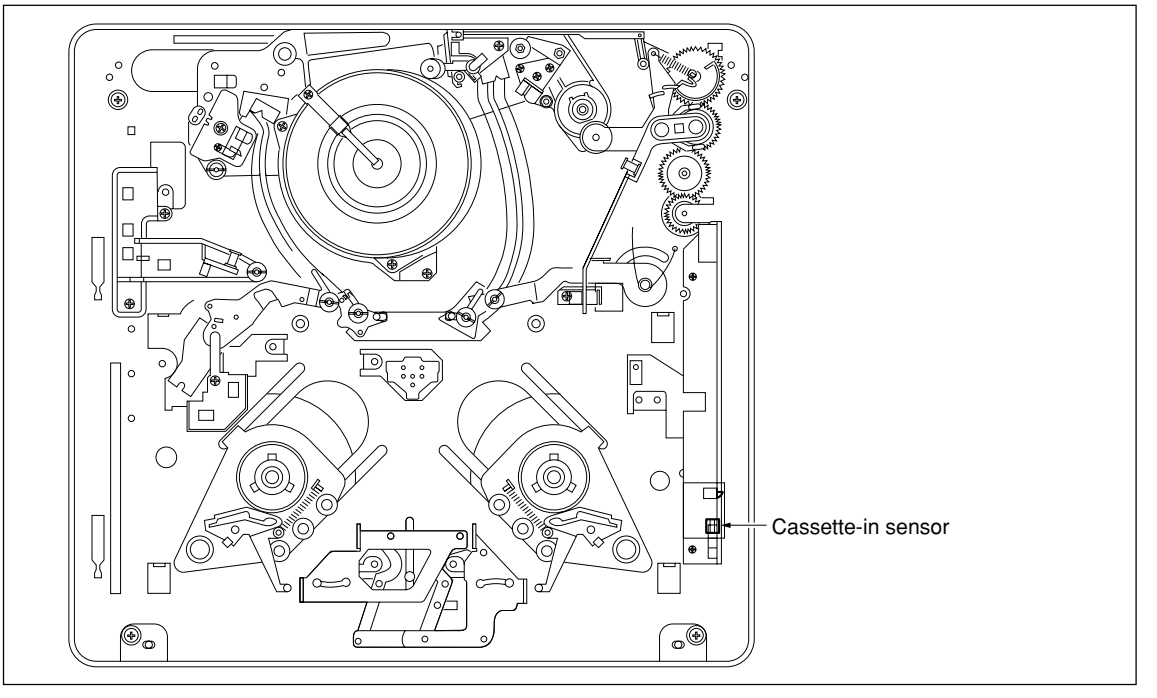
(4) Press the MENU (SHIFT + SET) button to terminate the check.

When result of the check shows any fault

- Check the cassette compartment.
- Check the sensor input port (IC1601 on the MB-919 board) of the MPU.



Location of switches in the cassette compartment block



Location of sensor

C002 : TOP/END SENSOR

This is the menu to check functions of the tape top sensor and tape end sensor.

```
   SERVO CHECK MODE
C002:TOP/END SENSOR

 END          TOP
 SENSOR       SENSOR

  OFF          OFF
```

(1) Bring a metallic screwdriver or the like closer to the respective sensors, and check that the character under the corresponding sensor changes from OFF" to "ON!".

Note

Never contact the screwdriver with the sensor.

(2) Move the screwdriver away, and check that the character under the corresponding sensor returns from "ON!" to "OFF".

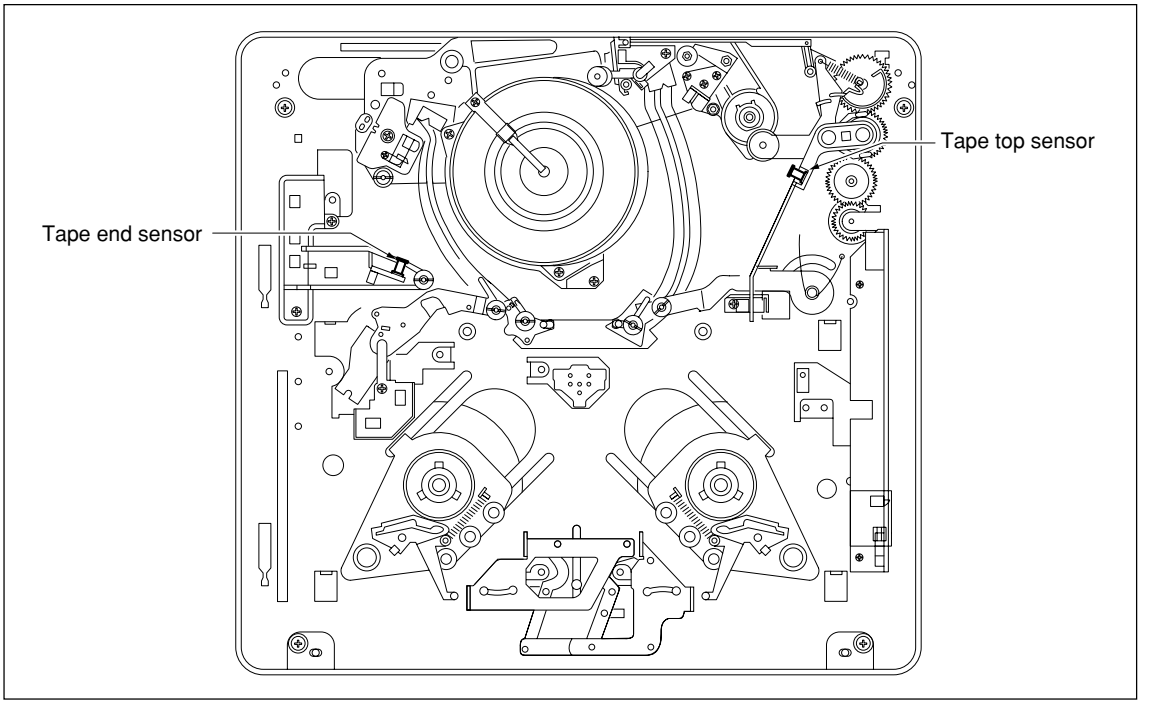
(Example)

```
   SERVO CHECK MODE
C002:TOP/END SENSOR

 END          TOP
 SENSOR       SENSOR

  OFF          ON!
```

(3) Press the MENU (SHIFT + SET) button to terminate the check.

When result of the check shows any fault

- Check the sensor itself.
- Check the sensor oscillator and its detection circuit (DR-432 board).
- Check the sensor input port (IC1601 on the MB-919 board) of the MPU.



Locations of the tape top sensor and tape end sensor

C003 : DEW SENSOR

This is the menu to check function of the DEW sensor.

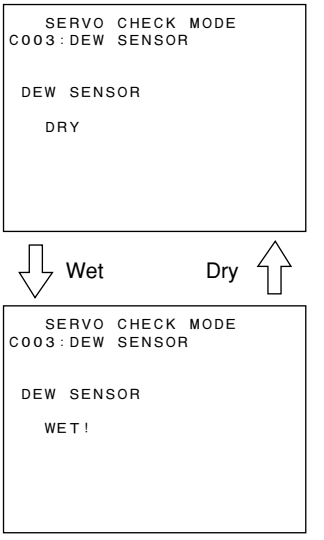
(1) Touch the dew sensor with a cotton swab moistened with water.

(2) Check that the message “DRY” changes to “WET!”.

(3) Wipe the sensor with a dry cotton swab and wipe up the water.
Or, blow air to the sensor with a blower and evaporate the water completely.

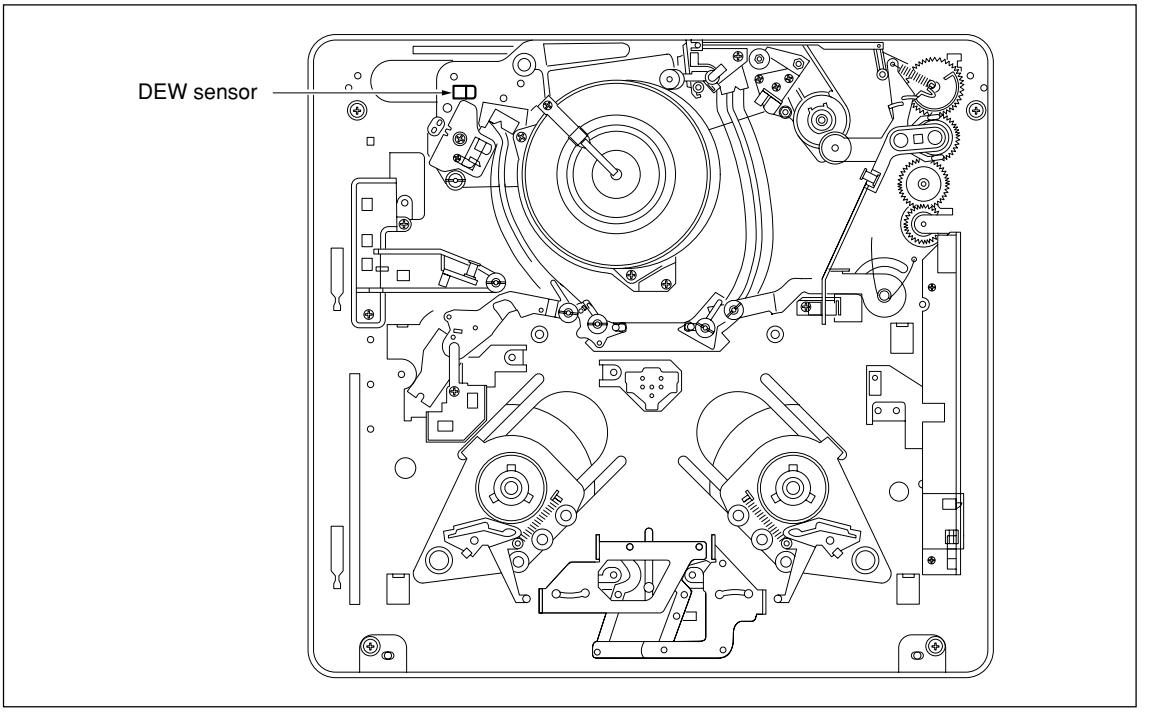
(4) After a while, confirm that the message “WET!” changes to “DRY”.

(5) Press the MENU (SHIFT + SET) button to terminate the check.



When result of the check shows any fault

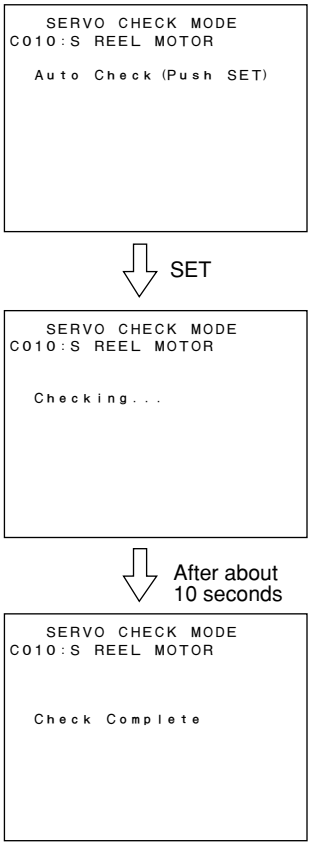
- Check the sensor itself.
- Check the detection circuit (DR-432 board).
- Check the sensor input port (IC1601 on the MB-919 board) of the MPU.



Location of the DEW sensor

C010 : S REEL MOTOR
C011 : T REEL MOTOR

This is the menu to check function of the S reel motor or T reel motor.



(1) Press the SET button.
- When the SET button is pressed, the check starts.
- The message “Checking...” appears on the superimposed display.

(2) Confirm result of the check.
- When the check ends without finding any fault, the message “Check Complete” appears on the superimposed display.

(3) Press the MENU (SHIFT + SET) button to terminate the check.

When result of the check shows any fault

When operation of the reel block is faulty
- Check the reel motor drive circuit (DR-432 board).
- Check the reel motor.

When the rotation speed of the reel block is not constant
- Perform A01 : S REEL FG DUTY or A02 : T REEL FG DUTY.
- Check the FG output from the reel motor.
- Check the reel FG shape circuit (DR-432 board).

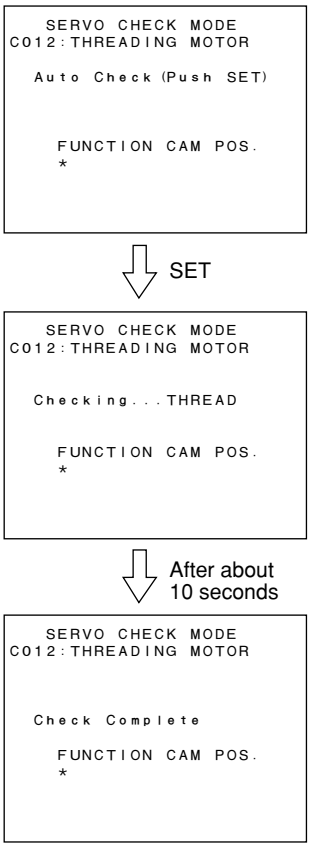
C012 : THREADING MOTOR

This is the menu to check functions of the threading motor and function cam sensors.

(1) Press the SET button.
- When the SET button is pressed, the check starts.
- The message “Checking...” appears on the superimposed display.
- Number of asterisks (∗) indicates the mode gear position that is output from the function cam sensors.

(2) Confirm result of the check.
- When the check ends without finding any fault, the message “Check Complete” appears on the superimposed display.

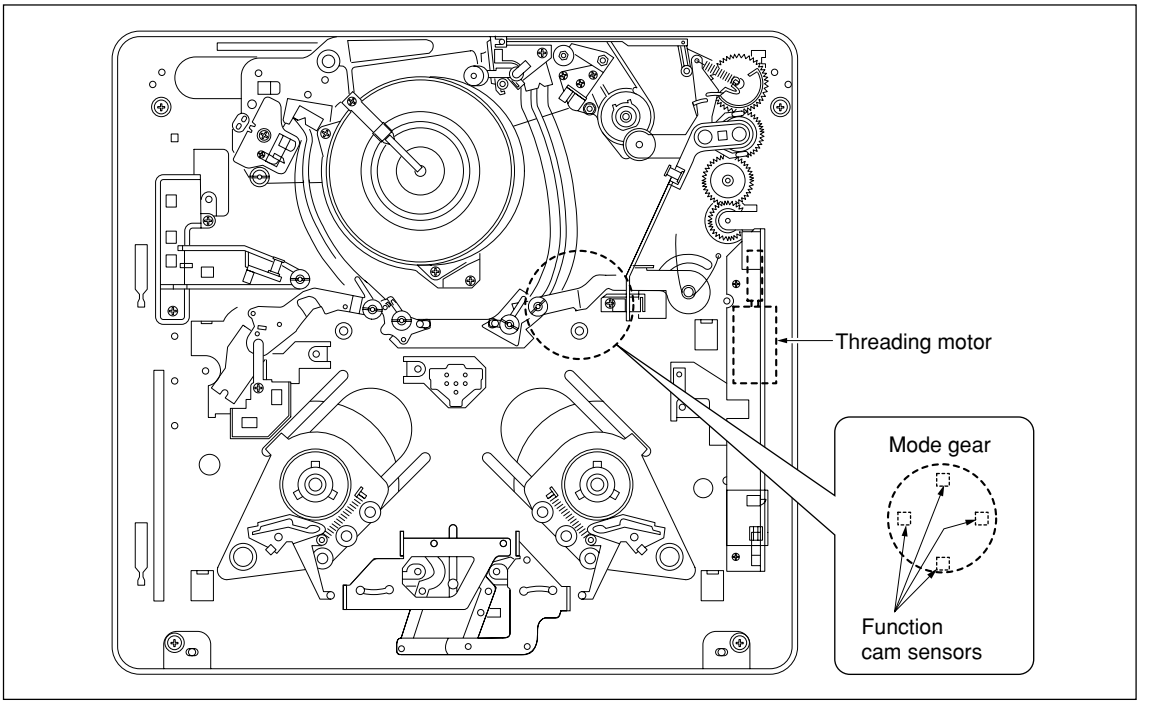
(3) Press the MENU (SHIFT + SET) button to terminate the check.



When result of the check shows any fault

When displaying “# Threading Trouble #” :
- Check if there exists any mechanical fault or not.
- Check the threading motor drive circuit (DR-432 board).
- Check the threading motor.

When displaying “# Sensor Trouble #” :
- Check the function cam sensor (DR-432 board).
- Check the mode gear.
- Check the sensor input port (IC1601 on the MB-919 board) of the MPU.



Location of the function cam sensors

C013 : CASSETTE COMP.

This is the menu to check function of the cassette compartment motor and cassette compartment UP sensor (switch).

CAUTION

Be careful not to execute this menu in a state that hands or any objects are left remained in the cassette compartment.

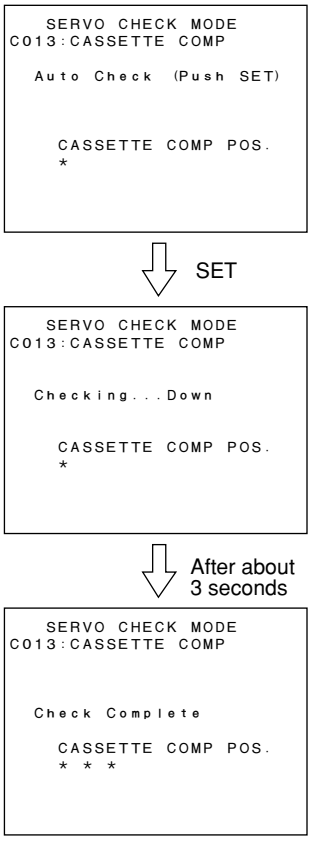
Notes

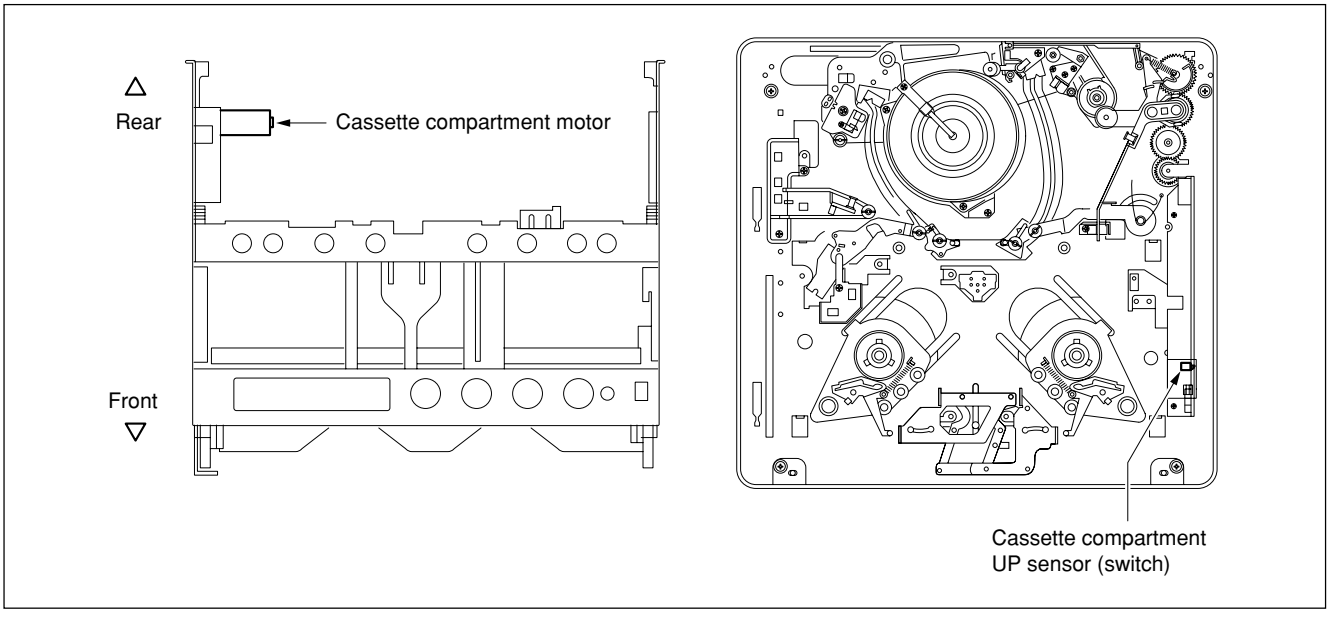
- When a cassette tape is left remained in the cassette insertion slot, remove it. If this menu is executed without removing the tape, the message "# CASSETTE Exist ! #" appears on the superimposed display and the desired check cannot be performed.
- When the motor driving time continues exceeding about 6 seconds, the power to the motor is stopped to protect the motor and the movable parts.

(1) Press the SET button.
- When the SET button is pressed, the check starts.
- "Checking..." appears on the superimposed display.
- Number of asterisks (*) indicates location of the cassette compartment that is output from each sensor.

(2) Confirm result of the check.
- When the check ends without finding any fault, the message "Check Complete" appears on the superimposed display.

(3) Press the MENU (SHIFT + SET) button to terminate the check.





Position of motor and sensor (switch)

When result of the check shows any fault

When displaying "# Cassette Comp Trouble #" :

- Check if there exists any mechanical fault or not.
- Check the cassette compartment motor drive circuit (DR-432 board).
- Check the cassette compartment motor.

When displaying "# Sensor Trouble #" :

- Check the cassette compartment UP sensor (switch/SE-605 board).
- Check C000 and C001.
- Check the sensor input port (IC1601 on the MB-919 board) of the MPU.

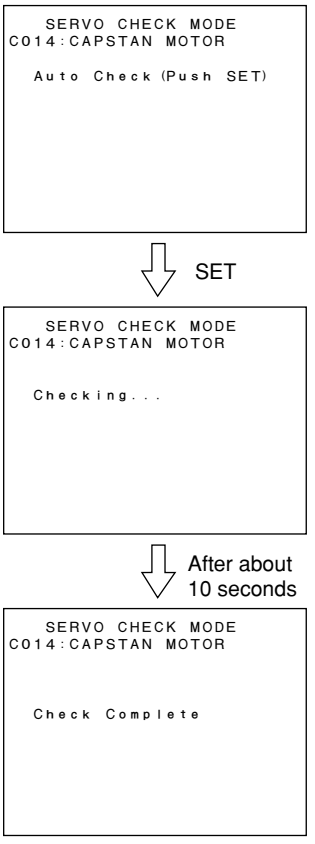
C014 : CAPSTAN MOTOR

This is the menu to check function of the capstan motor.

(1) Press the SET button.
- When the SET button is pressed, the check starts.
- "Checking..." appears on the superimposed display.

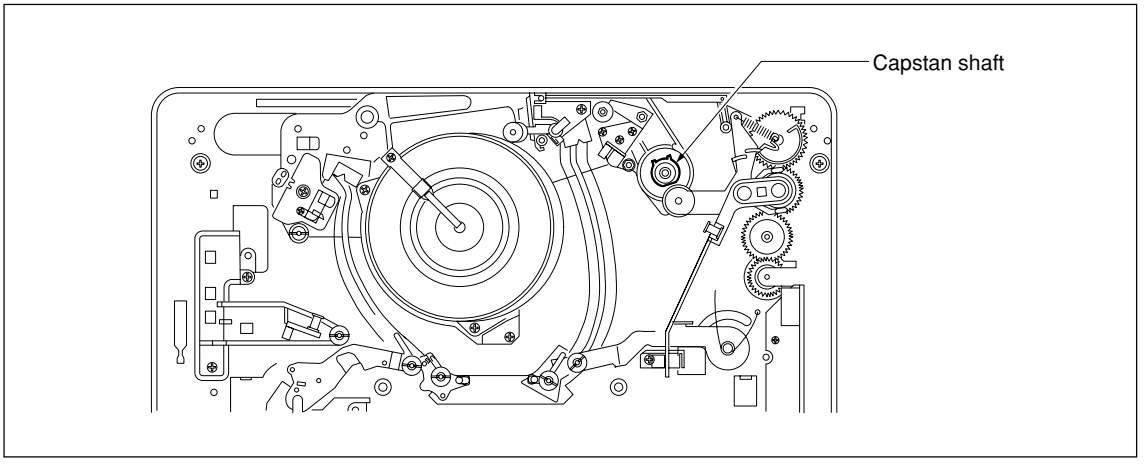
(2) Confirm result of the check.
- When the check ends without finding any fault, the message "Check Complete" appears on the superimposed display.

(3) Press the MENU (SHIFT + SET) button to terminate the check.



When result of the check shows any fault

- Check if there exists any mechanical fault or not.
- Perform A03 : CAPSTAN FG DUTY.
- Check the capstan motor drive circuit (DR-432 board).
- Check the FG output from the capstan motor.
- Check the capstan FG shape circuit (DR-432 board).
- Check the respective circuits that process the capstan FG on the DR-432 board.
- Check the capstan motor.



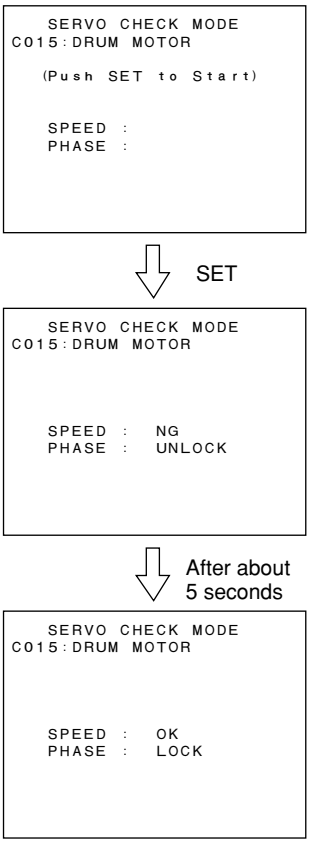
Location of the capstan shaft

C015 : DRUM MOTOR

This is the menu to check function of the drum motor.

(1) Press the SET button and check the following points.
- The drum rotates.
- The superimposed display changes as shown in the right.

(2) Press the MENU (SHIFT + SET) button to terminate the check.
- Check that rotation of the drum stops.



When result of the check shows any fault

- Check if there exists any mechanical fault or not.
- Check the drum motor drive circuit (DR-432 board).
- Check the FG output and PG output from the drum motor.
- Check the drum FG/PG shape circuit (DR-432 board).
- Check the respective circuits that process the drum FG/PG on the DR-432 board.

C020 : REEL BRAKE

This is the menu to check function of the reel brake and the brake plunger solenoid.

(1) Press the SET button and confirm that the reel brake operates correctly.
- The display changes from “BRAKE ON” to “BRAKE OFF”.

(2) Press the SET button again.
- The drive voltage of the brake plunger solenoid is turned ON and the display returns from “BRAKE OFF” to “BRAKE ON”.

(3) Press the MENU (SHIFT + SET) button to terminate the check.

When result of the check shows any fault

- Check if there exists any mechanical fault or not.
- Check the plunger solenoid drive circuit (DR-432 board).
- Check the plunger solenoid itself.

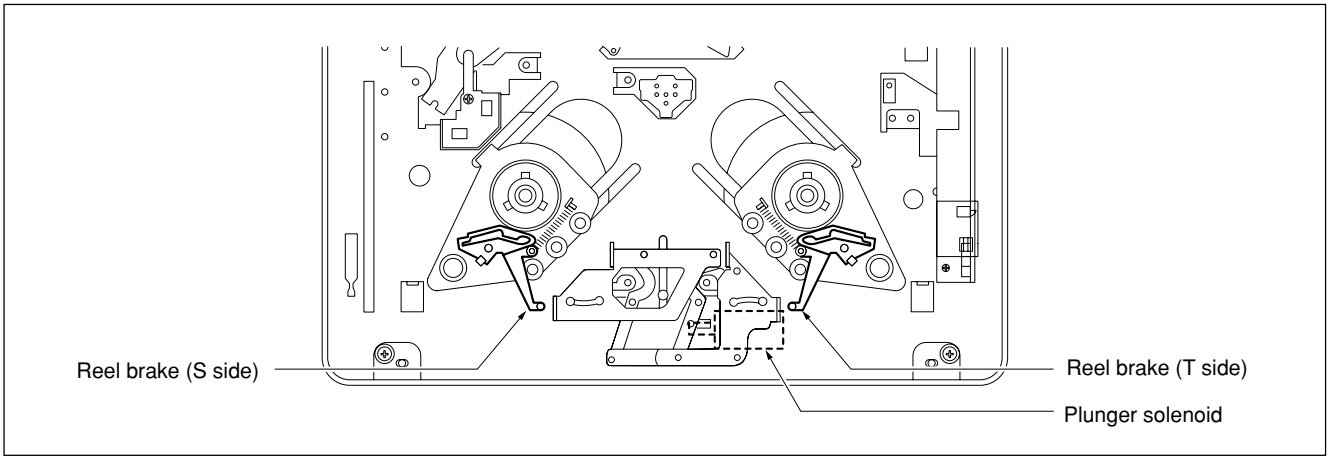
```
   SERVO CHECK MODE
C020:REEL BRAKE

   (Push SET for
        Check BRAKE OFF)

   ***  BRAKE ON  ***
```

SET

```
   SERVO CHECK MODE
C020:REEL BRAKE

   (Push SET for
        Check BRAKE ON)

   ***  BRAKE OFF ***
```

SET SET

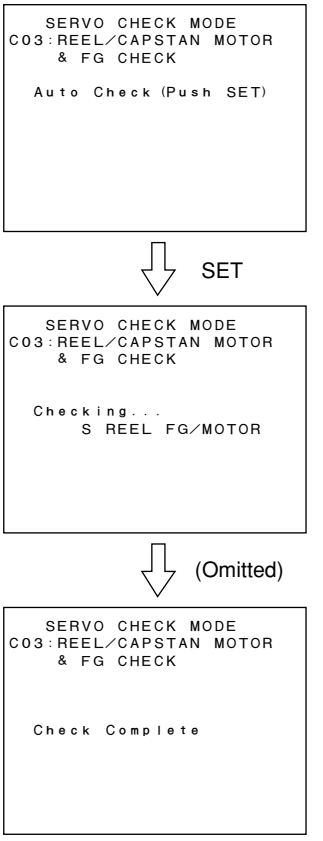
```
   SERVO CHECK MODE
C020:REEL BRAKE

   (Push SET for
        Check BRAKE OFF)

   ***  BRAKE ON  ***
```



Location of the plunger solenoid

C03 : REEL/CAPSTAN MOTOR & FG CHECK

This menu performs the following checks automatically and continuously.
- Duty ratio of S reel FG duty (S REEL FG/MOTOR)
- Duty ratio of T reel FG duty (T REEL FG/MOTOR)
- Duty ratio of Capstan FG duty (CAPSTAN FG/MOTOR)



(1) Press the SET button.
- When the SET button is pressed, the check starts.
- The message “Checking...” and the name of item under execution are shown on the superimposed display.

(2) Confirm result of the check.
- When the check ends without finding any fault, the message “Check Complete” appears on the superimposed display.
- When the check has not ended, the message “# Check Incomplete #” appears on the superimposed display. When this message appears, refer to “When result of the check shows any fault”.

(3) Press the MENU (SHIFT + SET) button to terminate the check.

When result of the check shows any fault

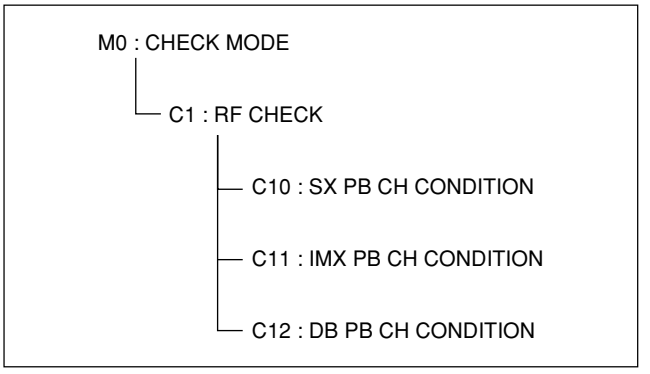
- Perform the check menu of each motor.
  C010 : S REEL MOTOR
  C011 : T REEL MOTOR
  C014 : CAPSTAN MOTOR

- Perform the adjust menu of each motor.
  A01 : S REEL FG DUTY
  A02 : T REEL FG DUTY
  A03 : CAPSTAN FG DUTY

- Check the drive system circuit (DR-432 board) of each motor.

3-2-3. RF CHECK Mode (C1)

C1 : RF CHECK
This is the mode to check the playback RF system of various digital recording formats.



Menu tree of the RF CHECK mode

Note

When the servo system has any abnormality, the respective menus of “C1 : RF CHECK” do not work correctly.

C10 : SX PB CH CONDITION

This is the mode to check the playback RF system of the Betacam SX format.

C11 : IMX PB CH CONDITION

(This mode is not displayed in the J-1)
This is the mode to check the playback RF system of the MPEG IMX format.
Only the models that have the playback function of the MPEG IMX format display this mode.

C12 : DB PB CH CONDITION

(This mode is not displayed in J-1 and J-2.)
This is the mode to check the playback RF system of the Digital Betacam format.
Only the models that have the playback function of the Digital Betacam format display this mode.

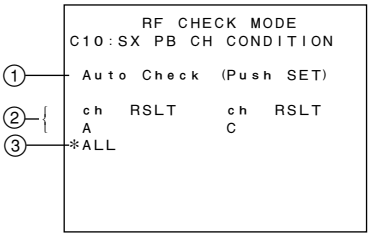
C10 : SX PB CH CONDITION

When the tape recorded by the Betacam SX format is played back with the optimum tracking, the error condition of each channel is checked and displayed in three steps (GRN, YEL, and RED) by this menu.

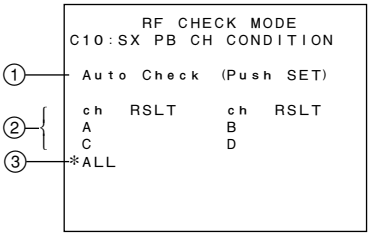
Notes

- Tapes that have been recorded by other formats are ejected automatically.
- When the servo system has any abnormality, the respective menus of "C1 : RF CHECK" do not work correctly.

J-1



J-2/J-3



Description of the superimposed display

① The message on this line changes. The message and the meaning are described as follows.

Auto Check (Push SET) :	Press the SET button to start the check.
Auto Checking... :	Check is on the way.
Auto Check Complete :	Check is complete.
Auto Check Incomplete :	Check has ended with fail.
Condition NG :	Error condition is unacceptable.
Insert SR5-1 :	Requesting insertion of alignment tape SR5-1 (for the 525 system)
Insert SR5-1P :	Requesting insertion of alignment tape SR5-1P (for the 625 system)

② When the condition check is going to be performed on each channel, select the desired channel with asterisk (*).
After completion of the check, the condition (GRN, YEL, and RED) is displayed in the right of the channel name.
When the check ends with fail, "RED" is displayed.

Note

"RSLT" means Result.
In J-1, "A" and "C" only are displayed, and "B" and "D" are not displayed.

③ When the condition check for all channels is going to be performed at the same time, select ALL.
As the check advances, the channel condition that has completed the check is displayed in the area ②.
After completion of the check of all channels, "GRN" is displayed in the right of ALL if all channels indicate "GRN". If even one channel indicates YEL or RED, the worst status is displayed in the right of ALL.

How to perform the "C10 : SX PB CH CONDITION" check

(1) Insert a cassette tape that has been recorded with the SX format.

Notes

- The inserted cassette must have the amount of recorded segment that is longer than execution time of the check.
  Normally, it takes about 10 seconds execution time for checking each channel, about 20 seconds for checking ALL in J-1, and about 40 seconds in J-2 and J-3.
- Use the alignment tape of SR5-1 (for the 525 system) or SR5-1P (for the 625 system) normally.

Note

If you want to change a tape before starting the check, press the SET button while pressing the EJECT button. The tape is ejected without affecting any result of the check.
Insert another tape and press the PLAY button, then the check starts. This operation does not match with the message on the superimposed display.

(2) Rotate the JOG dial to select the desired channel or ALL with asterisk (∗). Select ALL normally.

(3) Press the SET button.

- When the SET button is pressed, the tape runs automatically in the PLAY mode and the check starts.
- "Auto Checking..." appears on the superimposed display.
  During check of ALL, result of the channel check is displayed whenever check of one channel is complete
- To stop the check in the middle, press the MENU (SHIFT + SET) button.

Notes

- In case that "Auto Check (Push SET)" is displayed continuously, it is considered that the check is performed with an unrecorded portion of a tape. Recheck after rewinding the recorded portion of the tape to the beginning.
- The check cannot be performed correctly in any modes other than PLAY mode. Keep the machine in the PLAY mode until the check is complete.
  If the machine moves to any status other than the PLAY mode, the check is stopped and the condition changes to "RED".

(4) Confirm result of the check on the superimposed display.

- If no abnormality is found, "GRN" appears in the right of the selected channel or ALL.
- When "Auto Check Incomplete" appears on the superimposed display, refer to C10 "Auto Check Incomplete" described on the next page.
- When "Condition NG" appears on the superimposed display or any message other than "GRN" is displayed in the right of the channel that has been checked, refer to C10 "Condition NG" described on the next page.

Note

When checking ALL, and if result of the check of all channels is all "RED", refer to C10 "Auto Check Incomplete" described on the next page, even if "Condition NG" appears on the superimposed display.

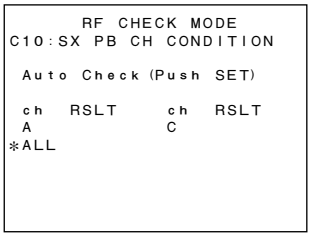
Note

Either of "GRN" or "YEL" or "RED" appears on the menu display. When "RED" is displayed, it cannot be confirmed from the menu display alone which of either the "condition fails" occurs or the "check ends with fail" occurs.
After completion of the ALL check, rotate the JOG dial and result of the check of each channel is displayed.

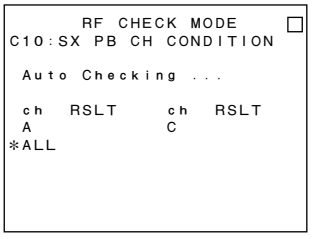
(5) Press the MENU (SHIFT + SET) button to exit the menu.
Or return to step (2) if you want to recheck using this menu.

Example of display and operation

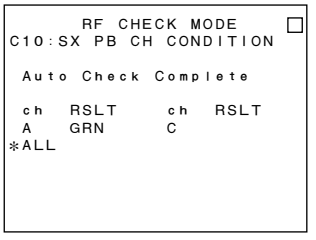
Example when selecting ALL with C10 : SX PB CH CONDITION. The superimposed display is J-1 as an example.



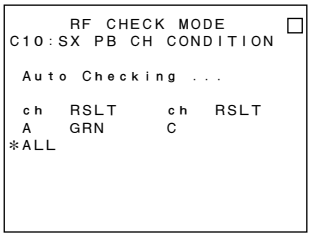
(1) ⇩ Insert SR5-1 or SR5-1P
(2) ⇩ Select
(3) ⇩ SET



⇩



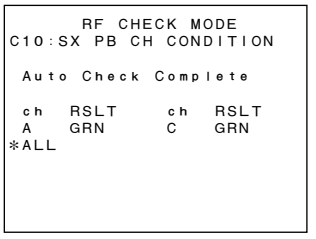
⇩



⇩

(Omitted)

⇩



(4) ⇩ Check
(5) ⇩ MENU (SHIFT + SET)

C10 “Auto Check Incomplete”

Change the tape position to start the check and try to recheck.
If C10 check does not end with fail this time, the portion of tape that has been used for the check before, may have a defect.

1. Check the cassette tape
   If a tape that has been recorded by a faulty Betacam SX VTR is used, the check may fail. Try to playback the tape that is recorded by another normal Betacam SX VTR and confirm that it can be played back normally.

2. When the tape that has been used for the check is not defective, the following causes are suspected.

   - Head clog
     ⇨ Perform steps (1) to (5) described in C10 “Condition NG”.
   - Defective adjustment of the servo system or defective circuit
     ⇨ Readjust the servo system.
     A00 : A01-A09 ADJUST
     A0A : RF SWITCHING POS.
     ⇨ Check the servo system.
     C010 : S REEL MOTOR
     C011 : T REEL MOTOR
     C014 : CAPSTAN MOTOR
     C015 : DRUM MOTOR
   - Failure of the shaft ground assembly, defective installation, or defective contact
     ⇨ Replace or rework.
   - Defective connection of the harness (between the drum assembly and the MB-919 board)
   - Defective adjustment of the RF playback system
     ⇨ Readjust the RF system (A10 : SX RF ADJUST)
   - Defective MB-919 board
   - Defective drum assembly

C10 “Condition NG”

Recheck and clean the drum (video head) in the following procedure.

(1) When checking by a tape other than alignment tape SR5-1 or SR5-1P, recheck using the alignment tape SR5-1 or SR5-1P.
When no abnormality is found, this is the end of the check.

Note

When no abnormality is found in the check using an alignment tape, the previous tape used for the check may have problem (such that the tape is damaged, recording is incorrect, and so on).

(2) Change the playback position of the alignment tape and perform the check again.
When no abnormality is found, this is the end of the check.

(3) After cleaning (referring to Section 4-2-1) with use of the cleaning tape (the cleaning tape should be used for 5 seconds or less), recheck using the alignment tape.
When no abnormality is found, this is the end of the check.

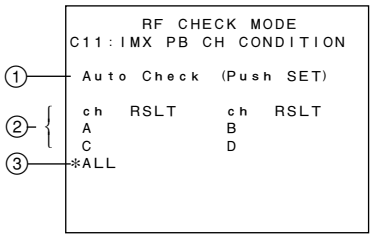
(4) After cleaning again with the cleaning tape (the cleaning tape should be used for 15 seconds or less), recheck using the alignment tape.
When no abnormality is found, this is the end of the check.

(5) Refer to Sections 4-2-2 and 4-2-3 and recheck with the alignment tape after cleaning the video head using a cleaning cloth.
When no abnormality is found, this is the end of the check.

If the condition is still unacceptable, the following causes are suspected.

- Defective adjustment of the servo system or circuit
  ⇨ Readjust the servo system.
  A00 : A01-A09 ADJUST
  A0A : RF SWITCHING POS.
  ⇨ Check the servo system.
  C010 : S REEL MOTOR
  C011 : T REEL MOTOR
  C014 : CAPSTAN MOTOR
  C015 : DRUM MOTOR
- Defective adjustment of the RF playback system
  ⇨ Readjust the RF system (A10 : SX RF ADJUST)
- The playback heads inside the drum assembly are worn out.
  ⇨ After confirming amount of the protrusion of the video heads (referring to Section 4-3), replace the upper drum assembly or drum assembly, if necessary.
- Defective adjustment of tape run system, or defective part mounting
  ⇨ Readjust or rework.
- Defective MB-919 board
- Defective drum assembly

C11 : IMX PB CH CONDITION



This is the dedicated menu of J-2 and J-3 and does not appear in J-1.
When the tape recorded by the MPEG IMX format is played back with the optimum tracking, the error condition of each channel is checked and displayed in three steps (GRN, YEL, and RED) by this menu.
Only the models that have the playback function of the MPEG IMX, have this menu.

Notes

- Tapes that have been recorded by other formats are ejected automatically.
- When the servo system has any abnormality, the respective menus of "C1 : RF CHECK" do not work correctly.

Description of the superimposed display

① The message on this line changes. The message and the meaning are described as follows.

Auto Check (Push SET) :	Press the SET button to start the check.
Auto Checking... :	Check is on the way.
Auto Check Complete :	Check is complete.
Auto Check Incomplete :	Check has ended with fail.
Condition NG :	Error condition is unacceptable.
Insert MR5-1 :	Requesting insertion of alignment tape MR5-1 (for the 525 system)
Insert MR5-1P :	Requesting insertion of alignment tape MR5-1P (for the 625 system)

② When the condition check is going to be performed on each channel, select the desired channel with asterisk (*).
After completion of the check, the condition (GRN, YEL, and RED) is displayed in the right of the channel name.
When the check ends with fail, "RED" is displayed.

Note

"RSLT" means Result.

③ When the condition check for all channels is going to be performed at the same time, select ALL.
As the check advances, the channel condition that has completed the check is displayed in the area ②.
After completion of the check of all channels, "GRN" is displayed in the right of ALL if all channels indicate "GRN". If even one channel indicates YEL or RED, the worst status is displayed in the right of ALL.

How to perform the "C11 : IMX PB CH CONDITION" check

(1) Insert a cassette tape that has been recorded with the MPEG IMX format.

Notes

- The inserted cassette must have the amount of recorded segment that is longer than execution time of the check.
  Normally, it takes about 10 seconds for checking of each channel and about 40 seconds for checking ALL.
- Use the alignment tape MR5-1 (for the 525 system) or MR5-1P (for the 625 system) normally.

(2) Rotate the JOG dial to select the desired channel or ALL with asterisk (*).
Select ALL normally.

(3) Press the SET button.

- When the SET button is pressed, the tape runs automatically in the PLAY mode and the check starts.
- "Auto Checking..." appears on the superimposed display.
  During check of ALL, result of the channel check is displayed whenever check of one channel is complete.
- To stop the check in the middle, press the MENU (SHIFT + SET) button.

Notes

- In case that "Auto Check (Push SET)" is displayed continuously, it is considered that the check is performed with an unrecorded portion of a tape. Recheck after rewinding the recorded portion of the tape to the beginning.
- The check cannot be performed correctly in any modes other than PLAY mode. Keep the machine in the PLAY mode until the check is complete.
  If the machine moves to any status other than the PLAY mode, the check is stopped and the condition changes to "RED".

(4) Confirm result of the check on the superimposed display.

- If no abnormality is found, "GRN" appears in the right of the selected channel or ALL.
- When "Auto Check Incomplete" appears on the superimposed display, refer to C11 "Auto Check Incomplete" described on the next page.
- When "Condition NG" appears on the superimposed display or any message other than "GRN" is displayed in the right of the channel that has been checked, refer to C11 " Condition NG" described on the next page.

Note

When checking ALL, and if result of the check of all channels is all "RED", refer to C11 "Auto Check Incomplete" described on the next page, even if "Condition NG" appears on the superimposed display.

Note

Either of "GRN" or "YEL" or "RED" appears on the menu display. When "RED" is displayed, it cannot be confirmed from the menu display alone which of either the "condition fails" occurs or the "check ends with fail" occurs.
After completion of the ALL check, rotate the JOG dial and result of the check of each channel is displayed.

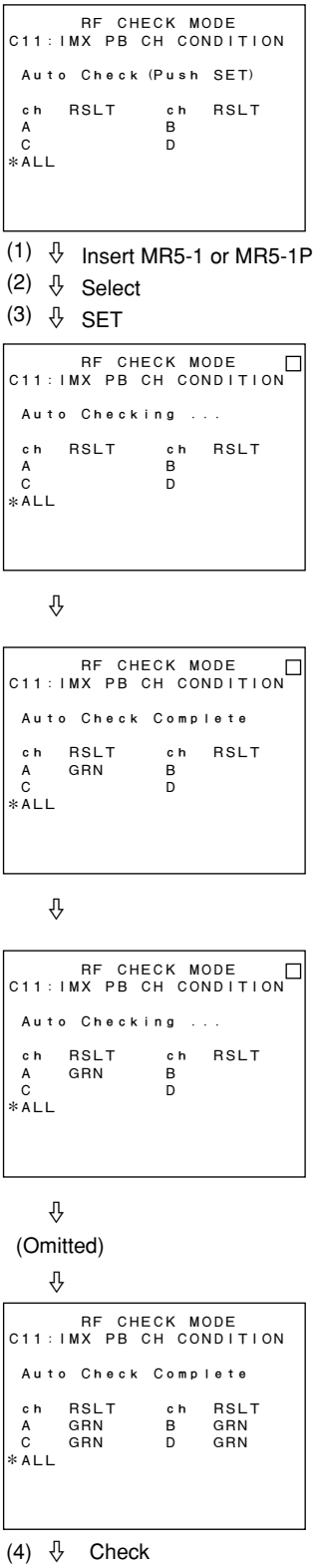
(5) Press the MENU (SHIFT + SET) button to exit the menu.
Or return to step (2) if you want to recheck using this menu.

Note

If you want to change a tape before starting the check, press the SET button while pressing the EJECT button. The tape is ejected without affecting any result of the check.
Insert another tape and press the PLAY button, then the check starts. This operation does not match with the message on the superimposed display.

Example of display and operation

Example when selecting ALL with C11 : IMX PB CH CONDITION



C11 "Auto Check Incomplete"

Change the tape position to start the check and try to recheck.
If the C11 check does not end with fail this time, the portion of tape that has been used for the check before, may have a defect.

1. Check the cassette tape
   If a tape that has been recorded by a faulty MPEG IMX VTR is used, the check may fail. Try to playback the tape that is recorded by another normal MPEG IMX VTR and confirm that it can be played back normally.

2. When the tape that has been used for the check, is not defective, the following causes are suspected.

   - Head clog
     ⇨ Perform steps (1) to (5) described in C11 "Condition NG".
   - Defective adjustment of the servo system or defective circuit
     ⇨ Readjust the servo system.
     A00 : A01-A09 ADJUST
     A0A : RF SWITCHING POS.
     ⇨ Check the servo system.
     C010 : S REEL MOTOR
     C011 : T REEL MOTOR
     C014 : CAPSTAN MOTOR
     C015 : DRUM MOTOR
   - Failure of the shaft ground assembly, defective installation, or defective contact
     ⇨ Replace or rework.
   - Defective connection of the harness (between the drum assembly and MB-919 board)
   - Defective adjustment of the RF playback system
     ⇨ Readjust the RF system (A11 : IMX RF ADJUST)
   - Defective MB-919 board
   - Defective drum assembly

C11 "Condition NG"

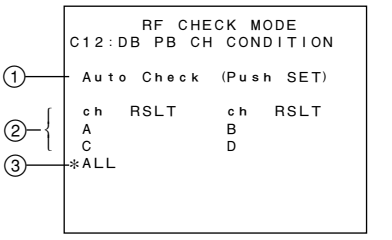
Recheck and clean the drum (video head) in the following procedure.

(1) When checking by a tape other than alignment tape MR5-1 or MR5-1P, recheck using the alignment tape MR5-1 or MR5-1P.
When no abnormality is found, this is the end of the check.
Note
When no abnormality is found in the check using an alignment tape, the previous tape used for the check may have problem (such that the tape is damaged, recording is incorrect, and so on).
(2) Change the playback position of the alignment tape and perform the check again.
When no abnormality is found, this is the end of the check.
(3) After cleaning (referring to Section 4-2-1) by the cleaning tape (the cleaning tape should be used for 5 seconds or less), recheck using the alignment tape.
When no abnormality is found, this is the end of the check.
(4) After cleaning again with the cleaning tape (the cleaning tape should be used for 15 seconds or less), recheck using the alignment tape.
When no abnormality is found, this is the end of the check.
(5) Refer to Section 4-2-2 and 4-2-3 and recheck with the alignment tape after cleaning the video head using cleaning cloth.
When no abnormality is found, this is the end of the check.

If the condition is still unacceptable, the following causes are suspected.

- Defective adjustment of the servo system or circuit
  ⇨ Readjust the servo system.
  A00 : A01-A09 ADJUST
  A0A : RF SWITCHING POS.
  ⇨ Check the servo system.
  C010 : S REEL MOTOR
  C011 : T REEL MOTOR
  C014 : CAPSTAN MOTOR
  C015 : DRUM MOTOR
- Defective adjustment of the RF playback system
  ⇨ Readjust the RF system (A11 : IMX RF ADJUST)
- The playback heads inside the drum assembly are worn out.
  ⇨ After confirming amount of protrusion of the video heads (referring to Section 4-3), replace the upper drum assembly or drum assembly, if necessary.
- Defective adjustment of tape run system, or defective part mounting
  ⇨ Readjust or rework.
- Defective MB-919 board
- Defective drum assembly

C12 : DB PB CH CONDITION



This is the dedicated menu of J-3 and does not appear in J-1 and J-2.
When the tape recorded by the digital BETACAM format is played back with the optimum tracking, the error condition of each channel is checked and displayed in three steps (GRN, YEL, and RED) by this menu.
Only the models that have the playback function of the digital Betacam, has this menu.

Notes

- Tapes that have been recorded by other formats are ejected automatically.
- When the servo system has any abnormality, the respective menus of "C1 : RF CHECK" do not work correctly.

Description of the superimposed display

① The message on this line changes. The message and the meaning are described as follows.

Auto Check (Push SET) :	Press the SET button to start the check.
Auto Checking... :	Check is on the way.
Auto Check Complete :	Check is complete.
Auto Check Incomplete :	Check has ended with fail.
Condition NG :	Error condition is unacceptable.
Insert ZR5-1 :	Requesting insertion of alignment tape ZR5-1 (for the 525 system)
Insert ZR5-1P :	Requesting insertion of alignment tape ZR5-1P (for the 625 system)

② When the condition check is going to be performed on each channel, select the desired channel with asterisk (*).
After completion of the check, the condition (GRN, YEL, and RED) is displayed in the right of the channel name.
When the check ends with fail, "RED" is displayed.

Note

"RSLT" means Result.

③ When the condition check for all channels is going to be performed at the same time, select ALL.
As the check advances, the channel condition that has completed the check is displayed in the area ②.
After completion of the check of all channels, "GRN" is displayed in the right of ALL if all channels indicate "GRN". If even one channel indicates YEL or RED, the worst status is displayed in the right of ALL.

How to perform the "C12 : DB PB CH CONDITION" check

(1) Insert a cassette tape that has been recorded with the digital Betacam format.

Notes

- The inserted cassette must have the amount of recorded segment that is longer than execution time of the check.
  Normally, it takes about 10 seconds for checking of each channel and about 40 seconds for checking ALL.
- Use the alignment tape ZR5-1 (for the 525 system) or ZR5-1P (for the 625 system) normally.

Note

If you want to change a tape before starting the check, press the SET button while pressing the EJECT button. The tape is ejected without affecting any result of the check.
Insert another tape and press the PLAY button, then the check starts. This operation does not match with the message on the superimposed display.

(2) Rotate the JOG dial to select the desired channel or ALL with asterisk (∗). Select ALL normally.

(3) Press the SET button.

- When the SET button is pressed, the tape runs automatically in the PLAY mode and the check starts.
- "Auto Checking..." appears on the superimposed display.
  During check of ALL, result of the channel check is displayed whenever check of one channel is complete
- To stop the check in the middle, press the MENU (SHIFT + SET) button.

Notes

- In case that "Auto Check (Push SET)" is displayed continuously, it is considered that the check is performed with an unrecorded portion of a tape. Recheck after rewinding the recorded portion of the tape to the beginning.
- The check cannot be performed correctly in any modes other than PLAY mode. Keep the machine in the PLAY mode until the check is complete.
  If the machine moves to any status other than the PLAY mode, the check is stopped and the condition changes to "RED".

(4) Confirm result of the check on the superimposed display.

- If no abnormality is found, "GRN" appears in the right of the selected channel or ALL.
- When "Auto Check Incomplete" appears on the superimposed display, refer to C12 "Auto Check Incomplete" described on the next page.
- When "Condition NG" appears on the superimposed display or any message other than "GRN" is displayed in the right of the channel that has been checked, refer to C12 "Condition NG" described on the next page.

Note

When checking ALL, and if result of the check of all channels is all "RED", refer to C12 "Auto Check Incomplete" described on the next page, even if "Condition NG" appears on the superimposed display.

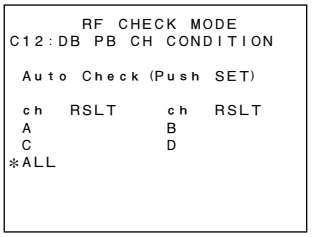
Note

Either of "GRN" or "YEL" or "RED" appears on the menu display. When "RED" is displayed, it cannot be confirmed from the menu display alone which of either the "condition fails" occurs or the "check ends with fail" occurs.
After completion of the ALL check, rotate the JOG dial and result of the check of each channel is displayed.

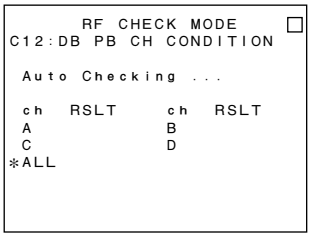
(5) Press the MENU (SHIFT + SET) button to exit the menu.
Or return to step (2) if you want to recheck using this menu.

Example of display and operation

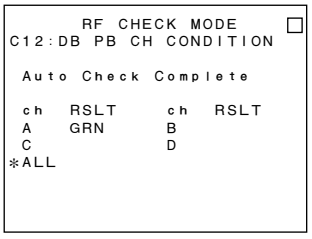
Example when selecting ALL with C12 : DB PB CH CONDITION



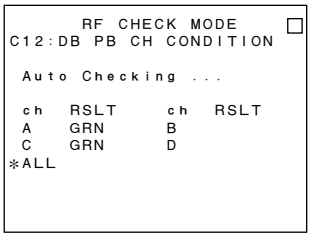
(1) ⇩ Insert ZR5-1 or ZR5-1P
(2) ⇩ Select
(3) ⇩ SET



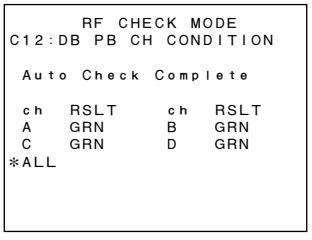
⇩



⇩



⇩
(Omitted)
⇩



(4) ⇩ Check
(5) ⇩ MENU (SHIFT + SET)

C12 "Auto Check Incomplete"

Change the tape position to start the check and try to recheck.
If C12 check does not end with fail this time, the portion of tape that has been used for the check before, may have a defect.

1. Check the cassette tape
   If a tape that has been recorded by a faulty digital Betacam VTR is used, the check may fail. Try to playback the tape that is recorded by another normal digital Betacam VTR and confirm that it can be played back normally.

2. When the tape that has been used for the check, is not defective, the following causes are suspected.

   - Head clog
     ⇨ Perform steps (1) to (5) described in C12 "Condition NG".
   - Defective adjustment of the servo system or defective circuit
     ⇨ Readjust the servo system.
     A00 : A01-A09 ADJUST
     A0A : RF SWITCHING POS.
     ⇨ Check the servo system.
     C010 : S REEL MOTOR
     C011 : T REEL MOTOR
     C014 : CAPSTAN MOTOR
     C015 : DRUM MOTOR
   - Failure of the shaft ground assembly, defective installation, or defective contact
     ⇨ Replace or rework.
   - Defective connection of the harness (between the drum assembly and MB-919 board)
   - Defective adjustment of the RF playback system
     ⇨ Readjust the RF system (A12 : DB RF ADJUST)
   - Defective MB-919 board
   - Defective drum assembly

C12 "Condition NG"

Recheck and clean the drum (video head) in the following procedure.

(1) When checking "C12 condition" by a tape other than alignment tape ZR5-1 or ZR5-1P, recheck using the alignment tape ZR5-1 or ZR5-1P.
When no abnormality is found, this is the end of the check.
Note
When no abnormality is found in the check using an alignment tape, the previous tape used for the check may have problem (such that the tape is damaged, recording is incorrect, and so on).
(2) Change the playback position of the alignment tape and perform the check again.
When no abnormality is found, this is the end of the check.
(3) After cleaning (referring to Section 4-2-1) by the cleaning tape (the cleaning tape should be used for 5 seconds or less), recheck using the alignment tape.
When no abnormality is found, this is the end of the check.
(4) After cleaning again with the cleaning tape (the cleaning tape should be used for 15 seconds or less), recheck using the alignment tape.
When no abnormality is found, this is the end of the check.
(5) Refer to Section 4-2-2 and 4-2-3 and recheck with the alignment tape after cleaning the video head using cleaning cloth.
When no abnormality is found, this is the end of the check.

If the condition is still unacceptable, the following causes are suspected.

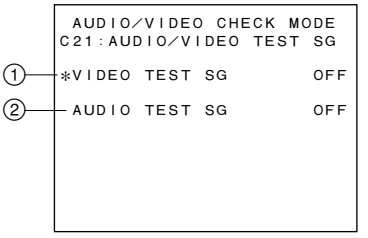
- Defective adjustment of the servo system or circuit
  ⇨ Readjust the servo system.
  A00 : A01-A09 ADJUST
  A0A : RF SWITCHING POS.
  ⇨ Check the servo system.
  C010 : S REEL MOTOR
  C011 : T REEL MOTOR
  C014 : CAPSTAN MOTOR
  C015 : DRUM MOTOR
- Defective adjustment of the RF playback system
  ⇨ Readjust the RF system (A12 : DB RF ADJUST)
- The playback heads inside the drum assembly are worn out.
  ⇨ After confirming amount of protrusion of the video heads (referring to Section 4-3), replace the upper drum assembly or drum assembly, if necessary.
- Defective adjustment of tape run system, or defective part mounting
  ⇨ Readjust or rework.
- Defective MB-919 board
- Defective drum assembly

3-2-4. AUDIO/VIDEO CHECK Mode (C2)

C2 : AUDIO/VIDEO CHECK
This mode has the following menu to check the audio system and video system.

Menu tree of the AUDIO/VIDEO CHECK mode

C21 : AUDIO/VIDEO TEST SG



① Operations of the video test signal generator in the maintenance mode can be selected.

Display	Operation of the video test signal generator
OFF	Stops operation
ON	Generates 75% color bars signal.

Setting the video test signal generator

(1) Rotates the JOG dial (or, SHUTTLE ring) to move the asterisk (*) mark to VIDEO TEST SG.
(2) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) to let the desired setup appear on the display.

Note

This setup remains valid until the maintenance mode ends.

② Selects the desired operation of the video test signal generator in the maintenance mode.

Display	Operation of the audio test signal generator
OFF	Stops operation
ON	Generates the 1 kHz sine signal.

Setting the audio test signal generator

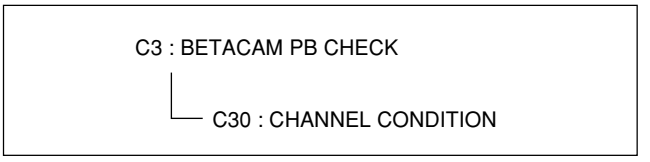
(1) Rotate the JOG dial (or SHUTTLE ring) to move the asterisk (*) mark to “AUDIO TEST SG”.
(2) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) to let the desired setup on the display.

Note

This setup remains valid until the maintenance mode is complete.

3-2-5. BETACAM PB CHECK Mode (C3)

C3 : BETACAM PB CHECK
This is the mode to check the playback RF system of the Betacam or Betacam SP format.



Menu of the Betacam PB check

C30 : CHANNEL CONDITION

This menu displays the RF level condition of each channel (YA, YB, CA, and CB) in two steps (GRN and RED) when a tape that has been recorded by Betacam or Betacam SP format, is played back in the PLAY mode.

Note

When the servo system has abnormality, C30 : CHANNEL CONDITION does not work normally.

How to execute the check

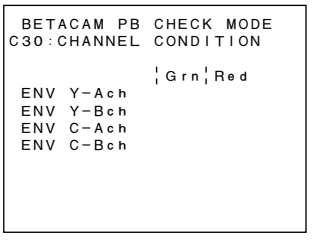
- To stop the check in the middle, press the MENU (SHIFT + SET) button twice.

(1) Insert a tape that has been recorded by Betacam or Betacam SP format.
(2) Press the PLAY button. (Playback in PLAY mode.)
  - ">>>" is displayed on the superimposed display.

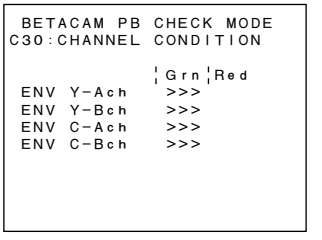
  Note

  The check cannot be performed in any modes other than PLAY mode. If a portion of the tape that has been recorded by any formats other than Betacam or Betacam SP format, or an unrecorded portion of the tape is played back in PLAY mode, ">>>" is not displayed.
(3) Check that ">>>" is displayed in the "GRN" column in all channels.
  - When ">>>" is displayed in "RED" column, refer to C30 "Condition NG" described on the next page.
(4) Stop the playback of the tape to terminate the check.
(5) Press the SET button.
  - White square appears in the upper right of the superimposed display.
(6) Eject the cassette tape.
(7) Press the MENU (SHIFT + SET) button.
  - White square disappears from the upper right of the superimposed display.
(8) Press the MENU (SHIFT + SET) button to exit the menu.

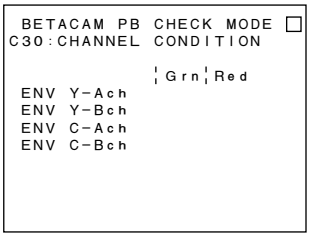
Example of display and operation



(1) ⇩ Insert a recorded cassette tape
(2) ⇩ PLAY



(3) ⇩ Check
(4) ⇩ STOP
(5) ⇩ SET



(6) ⇩ EJECT
(7) ⇩ MENU (SHIFT + SET)
(8) ⇩ MENU (SHIFT + SET)

C30 “Condition NG”

Recheck and perform the cleaning of the drum (video head) in the following procedure.

(1) Change the playback position of the alignment tape and perform the check again.
When no abnormality is found, this is the end of the check.
(2) After cleaning (referring to Section 4-2-1) with the cleaning tape (the tape should be used for 5 seconds or less), recheck using the alignment tape.
When no abnormality is found, this is the end of the check.
(3) After cleaning again with the cleaning tape (the cleaning tape should be used for 15 seconds or less), recheck using the alignment tape.
When no abnormality is found, this is the end of the check.
(4) Refer to Section 4-2-2 and 4-2-3 and recheck with the alignment tape after cleaning the video head using cleaning cloth.
When no abnormality is found, this is the end of the check.
If the condition is still unacceptable, the following causes are suspected.

Defective playback tape

- Tape is damaged
- Recording is incorrect

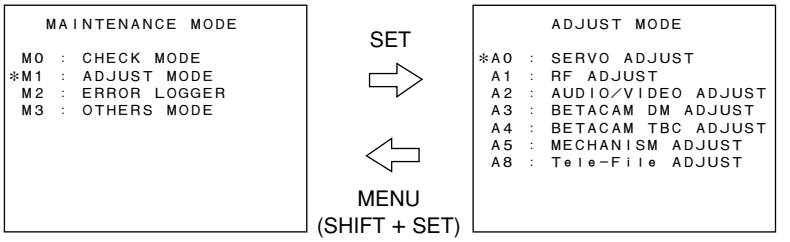
Defective machine

- Defective adjustment of Betacam playback system
  ⇨ Readjust (A3 : BETACAM DM ADJUST)
  Perform the same adjustment when the DM-124 board is replaced.
- Defective adjustment of the tape run system or defective part mounting
  ⇨ Readjust or rework.
- The playback heads inside the drum assembly are worn out.
  ⇨ After confirming amount of protrusion of the video heads (referring to Section 4-3), replace the upper drum assembly, if necessary.
- Defective DM-124 board
- Defective drum assembly

3-3. ADJUST Mode (M1)

3-3-1. Overview

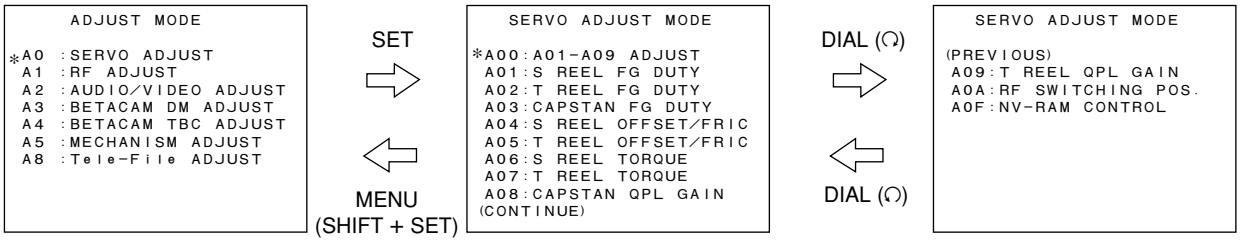
M1 : ADJUST MODE is the adjustment mode.



MAINTENANCE mode **ADJUST mode**

A0 : SERVO ADJUST

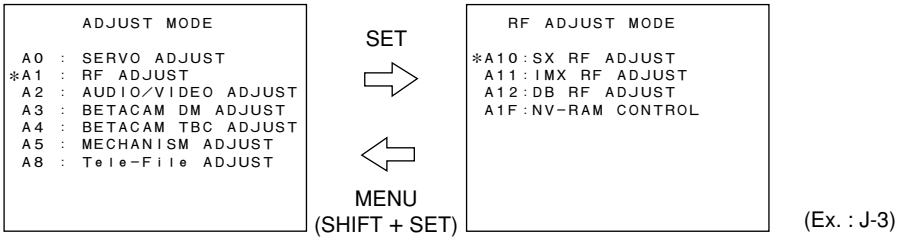
This is the adjustment mode of the servo system.
For details, refer to Section 3-3-2 (page 3-40).



Title		Page	Description
A0 :	SERVO ADJUST	–	Servo system adjustment mode
	A00 : A01-A09 ADJUST	3-41	Continuous execution of adjustments starting from A01 to A09
	A01 : S REEL FG DUTY	3-42	Duty ratio adjustment of the S reel FG
	A02 : T REEL FG DUTY	3-42	Duty ratio adjustment of the T reel FG
	A03 : CAPSTAN FG DUTY	3-42	Duty ratio adjustment of the capstan FG
	A04 : S REEL OFFSET/FRICTION	3-42	Adjustment of the S reel offset and friction
	A05 : T REEL OFFSET/FRICTION	3-42	Adjustment of the T reel offset and friction
	A06 : S REEL TORQUE	3-42	Adjustment of the S reel torque
	A07 : T REEL TORQUE	3-42	Adjustment of the T reel torque
	A08 : CAPSTAN QPL GAIN	3-42	Gain adjustment of the capstan QPL
	A09 : T REEL QPL GAIN	3-42	Gain adjustment of the T reel QPL
	A0A : RF SWITCHING POS.	3-43	RF switching position adjustment
	A0F : NV-RAM CONTROL	3-45	Saving the servo system adjustment data

A1 : RF ADJUST

This is the adjustment mode of RF system.
For details, refer to Section 3-3-3 (page 3-45).



(Ex. : J-3)

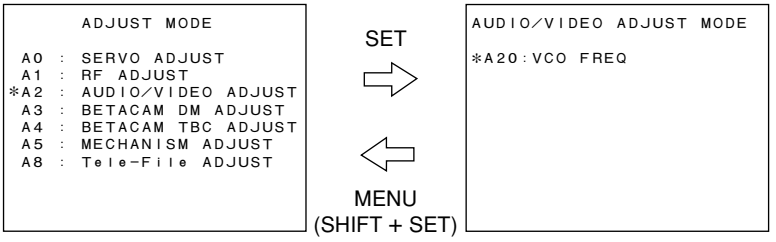
Title		Page	Description
A10 :	SX RF ADJUST	–	Adjustment mode of RF system of Betacam SX format
	A101 : EQUALIZER	3-47	Automatic adjustment of PB head playback level and playback equalizer
	A103 : PLAY PLL	3-47	Adjustment of playback PLL circuit (in PLAY mode)
	A104 : FWD PLL	3-47	Adjustment of playback PLL circuit (in FORWARD mode)
	A105 : REV PLL	3-47	Adjustment of playback PLL circuit (in REVERSE mode)
	A106 : A/D GAIN	3-47	Gain adjustment when A/D converting the playback RF signal
	A107 : A101-A106 ALL ADJUST	3-51	Continuous execution of the above adjustments starting from A101 to A106
A11 :	IMX RF ADJUST	–	Adjustment mode of RF system of MPEG IMX format
	A111 : EQUALIZER	3-53	Adjustment of PB head playback level and playback equalizer
	A113 : PLAY PLL	3-53	Adjustment of playback PLL circuit (in PLAY mode)
	A114 : FWD PLL	3-53	Adjustment of playback PLL circuit (in FORWARD mode)
	A115 : REV PLL	3-53	Adjustment of playback PLL circuit (in REVERSE mode)
	A116 : A/D GAIN	3-53	Gain adjustment when A/D converting the playback RF signal
	A117 : A111-A116 ALL ADJUST	3-57	Continuous execution of above adjustments starting from A111 to A116
A12 :	DB RF ADJUST	–	Adjustment mode of RF system of digital Betacam format
	A121 : EQUALIZER	3-59	Automatic adjustment of PB head playback level and playback equalizer
	A123 : PLAY PLL	3-59	Adjustment of playback PLL circuit (in PLAY mode)
	A124 : FWD PLL	3-59	Adjustment of playback PLL circuit (in FORWARD mode)
	A125 : REV PLL	3-59	Adjustment of playback PLL circuit (in REVERSE mode)
	A126 : A/D GAIN	3-59	Gain adjustment when A/D converting the playback RF signal
	A127 : A121-A126 ALL ADJUST	3-63	Continuous execution of above adjustments starting from A121 to A126
A1F :	NV-RAM CONTROL	3-65	Saving the RF system adjustment data

Notes

- In J-1, A11 : IMX RF ADJUST, A12 : DB RF ADJUST are not displayed.
- In J-2, A12 : DB RF ADJUST is not displayed.

A2 : AUDIO/VIDEO ADJUST

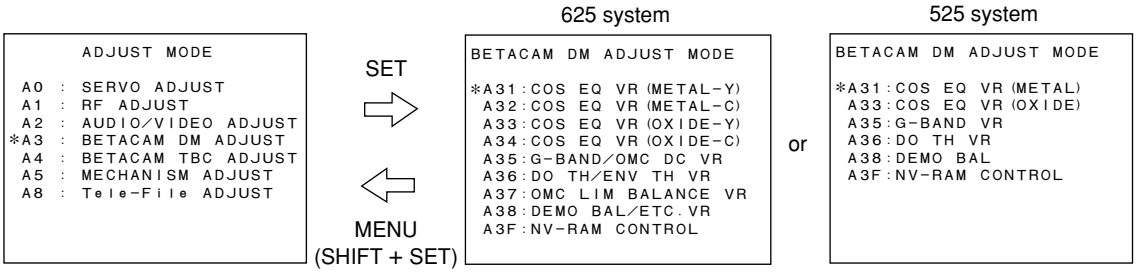
This is the adjustment mode of the audio and video systems.
For details, refer to Section 3-3-4 (page 3-66).



Title	Page	Description
A20 : VCO FREQ	3-66	Adjustment of the reference signal system and the analog video output of the IF board

A3 : BETACAM DM ADJUST

This is the adjustment mode of the playback system of Betacam and Betacam SP formats.
For details, refer to Section 3-3-5 (page 3-67).
Contents of menu are different in the 525 system and 625 system.

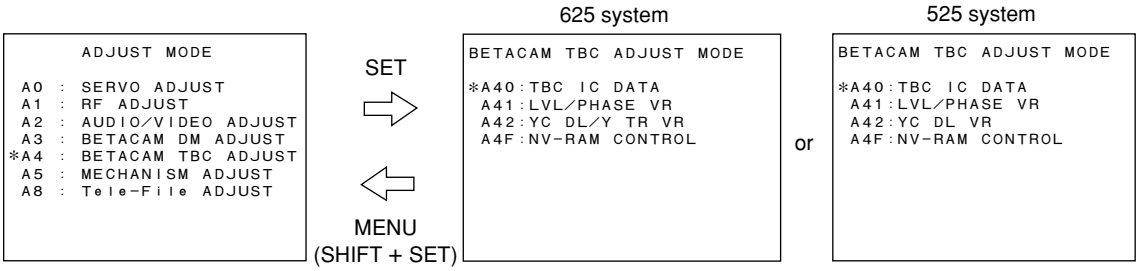


Title (in 525 system)	Page	Description
A31 : COS EQ VR (METAL)	3-68	Adjustment of metal tape playback equalizer (DM-124 board)
A33 : COS EQ VR (OXIDE)	3-68	Adjustment of oxide tape playback equalizer (DM-124 board)
A35 : G-BAND VR	3-69	Adjustment of guard band width
A36 : DO TH VR	3-69	Adjustment of dropout threshold level
A38 : DEMO BAL	3-70	Adjustment of demodulator balance
A3F : NV-RAM CONTROL	3-71	Saving of the above adjustments and the A4 : Betacam TBC adjustment/setup data

Title (in 625 system)	Page	Description
A31 : COS EQ VR (METAL-Y)	3-68	Adjustment of metal tape playback equalizer (DM-124 board) of Y signal
A32 : COS EQ VR (METAL-C)	3-68	Adjustment of metal tape playback equalizer (DM-124 board) of C signal
A33 : COS EQ VR (OXIDE-Y)	3-68	Adjustment of oxide tape playback equalizer (DM-124 board) of Y signal
A34 : COS EQ VR (OXIDE-C)	3-69	Adjustment of oxide tape playback equalizer (DM-124 board) of C signal
A35 : G-BAND/OMC DC VR	3-60	Adjustment of guard band width and setup of DC offset level of over-modulation correction circuit
A36 : DO TH/ENV TH VR	3-60	Adjustment of dropout threshold level and setup of RF envelope threshold level
A37 : OMC LIM BALANCE VR	3-70	Limiter balance adjustment of over modulation correction circuit
A38 : DEMO BAL/ETC. VR	3-70	Demodulator balance adjustment, etc.
A3F : NV-RAM CONTROL	3-71	Saving of the above adjustment data and the A4 : Betacam TBC adjustment/setup data

A4 : BETACAM TBC ADJUST

This is the adjustment mode of the TBC system of the Betacam and Betacam SP formats.
For details, refer to Section 3-3-6 (page 3-72).
Contents of menu are different in the 525 system and 625 system.

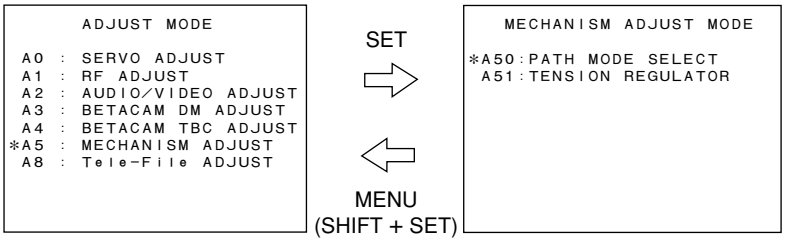


Title (in 525 system)	Page	Description
A40 : TBC IC DATA	3-73	Setting the read clock timing of TBC block
A41 : LVL/PHASE VR	3-73	A/D converter level adjustment and playback video phase adjustment
A42 : YC DL VR	3-73	Y/C delay adjustment
A4F : NV-RAM CONTROL	3-74	Saving of the above adjustments, setup data, and the A3 : BETACAM DM adjustment data

Title (in 625 system)	Page	Description
A40 : TBC IC DATA	3-73	Setting the read clock timing of TBC block and the playback VISC phase detection circuit data
A41 : LVL/PHASE VR	3-73	A/D converter level adjustment and playback video phase adjustment
A42 : YC DL/YTR VR	3-73	Y/C delay adjustment and tracking offset adjustment during shuttle mode
A4F : NV-RAM CONTROL	3-74	Saving of the above adjustments, setup data, and the A3 : BETACAM DM adjustment data

A5 : MECHANISM ADJUST

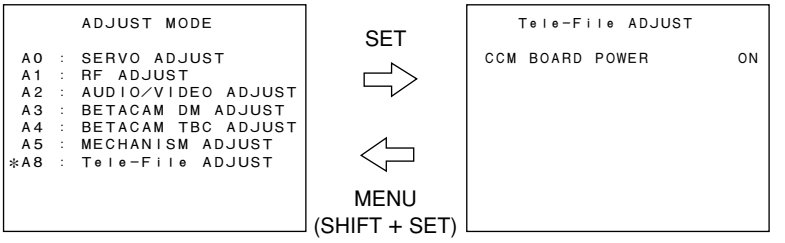
This is the adjustment mode of mechanism deck.
For details, refer to Section 3-3-7 (page 3-75).



Title	Page	Description
A50 : PATH MODE SELECT	3-75	Tape running system adjustment
A51 : TENSION REGULATOR	3-76	Tension regulator adjustment

A8 : Tele-File ADJUST

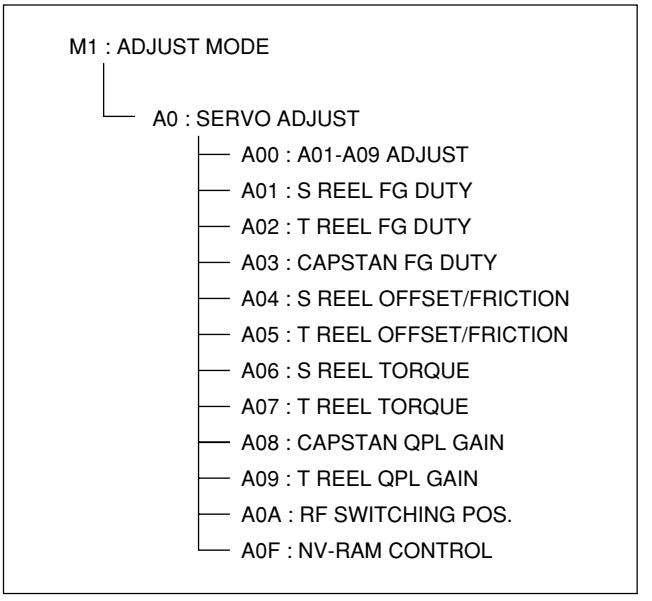
This is the menu to turn on the power of the Tele-File circuit during the Tele-File adjustment.
For details, refer to Section 3-3-8 (page 3-77).



Title	Page	Description
A8 : Tele-File ADJUST	3-77	Tele-File system adjustment mode

3-3-2. SERVO ADJUST Mode (A0)

A0 : SERVO ADJUST
This is the mode for the servo system adjustment.


M1 : ADJUST MODE
A0 : SERVO ADJUST
A00 : A01-A09 ADJUST
A01 : S REEL FG DUTY
A02 : T REEL FG DUTY
A03 : CAPSTAN FG DUTY
A04 : S REEL OFFSET/FRICTION
A05 : T REEL OFFSET/FRICTION
A06 : S REEL TORQUE
A07 : T REEL TORQUE
A08 : CAPSTAN QPL GAIN
A09 : T REEL QPL GAIN
A0A : RF SWITCHING POS.
A0F : NV-RAM CONTROL

Menu tree of the SERVO ADJUST mode

Note

When the machine enters the A0 mode, cassette tape is ejected automatically if the cassette tape is being inserted.

A0 : SERVO ADJUST

This is the adjustment mode of the servo system.

A00 : A01-A09 ADJUST

This menu performs the following adjustment menus automatically and successively.

A01 : S REEL FG DUTY
A02 : T REEL FG DUTY
A03 : CAPSTAN FG DUTY
A04 : S REEL OFFSET/FRICTION
A05 : T REEL OFFSET/FRICTION
A06 : S REEL TORQUE
A07 : T REEL TORQUE
A08 : CAPSTAN QPL GAIN
A09 : T REEL QPL GAIN

Note

The adjustment is performed in the following order.
A08→A09→A01→A02→A03→A04→A05→A06→A07

How to execute

(1) Press the SET button.
- Press the SET button and the automatic adjustment starts.
  It takes about 150 seconds to execute the automatic adjustment.
- While the automatic adjustment is in progress, name of the adjustment menu that is being executed at the moment and the message "Auto Adjusting..." appear on the superimposed display.
- When each adjustment menu ends with success, the message "Adjust Complete" appears each time momentarily on the superimposed display.
  When the adjustment ends with fail, the message "# Adjust Incomplete #" appears on the superimposed display. When this message appears, refer to "When the Automatic Adjustment Ends with Fail" on page 3-44.

(2) Check result of the adjustment.
- When all adjustments end with success, the message "Adjust Complete" keeps appearing on the superimposed display.

(3) Press the MENU (SHIFT + SET) button to exit the menu.

(4) To save the adjustment data, enter A0F : NV-RAM CONTROL and execute "SAVE SERVO ADJUST DATA".

Example of display and operation

Superimposed display

```
   SERVO ADJUST MODE
A00:A01-A09 ADJUST

  Auto Adjust(Push SET)
```

(1) ⇩ SET

```
   SERVO ADJUST MODE
A00:A01-A09 ADJUST

 CAPSTAN FG DUTY

 Auto Adjusting ...
```

⇩

```
   SERVO ADJUST MODE
A00:A01-A09 ADJUST

 S REEL FG DUTY

 Auto Adjusting ...
```

⇩

(Omitted)

⇩

```
   SERVO ADJUST MODE
A00:A01-A09 ADJUST

 S/T TENSION OFFSET

 Auto Adjusting ...
```

⇩

```
   SERVO ADJUST MODE
A00:A01-A09 ADJUST

 S/T TENSION OFFSET

 Adjust Complete
```

(2) ⇩ Check
(3) ⇩ MENU (SHIFT + SET)
(4) Save

```
*A0F:NV-RAM CONTROL
```

```
   SERVO ADJUST MODE
A00:A01-A09 ADJUST

 S/T REEL OFFSET/FRIC

# Adjust Incomplete    #

# REEL speed NG!       #
```

When the automatic adjustment ends with fail (example)

A01 : S REEL FG DUTY
A02 : T REEL FG DUTY
A03 : CAPSTAN FG DUTY
A04 : S REEL OFFSET/FRICTION
A05 : T REEL OFFSET/FRICTION
A06 : S REEL TORQUE
A07 : T REEL TORQUE
A08 : CAPSTAN QPL GAIN
A09 : T REEL QPL GAIN

The respective menus execute the automatic adjustments as listed below respectively.

A01 : S reel FG duty adjustment
A02 : T reel FG duty adjustment
A03 : Capstan FG duty adjustment
A04 : S reel offset/Friction adjustment
A05 : T reel offset/Friction adjustment
A06 : S reel torque adjustment
A07 : T reel torque adjustment
A08 : Capstan QPL gain adjustment
A09 : T reel QPL gain adjustment

How to execute

(1) Press the SET button.
- Press the SET button and the automatic adjustment starts.
  It takes about 15 seconds to perform each adjustment of A01 to A03 and about 20 seconds to perform each of remaining adjustments.
- While the automatic adjustment is in progress, "Auto Adjusting..." appears on the superimposed display only.

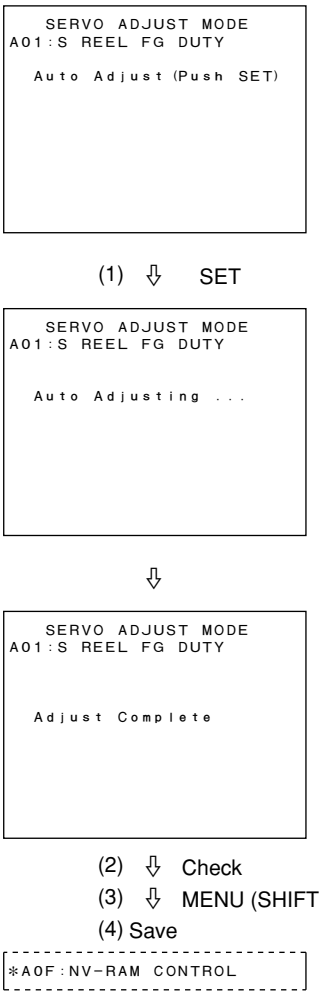
(2) Check result of the adjustment.
- When automatic adjustment ends with success, the message "Adjust Complete" appears on the superimposed display.
- When the automatic adjustment ends with fail, the message "# Adjust Incomplete #" appears on the superimposed display. When this message appears, refer to "When the Automatic Adjustment Ends with Fail" on page 3-44.

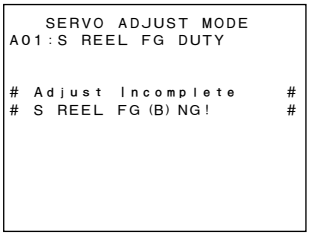
(3) Press the MENU (SHIFT + SET) button to exit the menu.

(4) To save the adjustment data, enter A0F : NV-RAM CONTROL and execute "SAVE SERVO ADJUST DATA".

Example of display and operation

Example of A01 : S REEL FG DUTY





When the automatic adjustment ends with fail (example)

A0A : RF SWITCHING POS.

This menu executes the automatic adjustment of the RF switching position.

Notes

- This adjustment can be performed either in the 525 system or 625 system. It is not necessary to perform in both systems.
- This adjustment requires the following alignment tape that is cued up to the time code 00 : 00 : 00 : 00.

	J-1	J-2	J-3
525 system	SR5-1	MR5-1	ZR5-1
625 system	SR5-1P	MR5-1P	ZR-5-1P

If any tape other than the specified alignment tape is used for this adjustment, the correct adjustment cannot be performed even though "Auto Adjust Complete" appears upon completion of adjustments.

How to execute

(1) Press the SET button.
(2) Insert the alignment tape that is cued up to the time code 00 : 00 : 00 : 00.
  - Insert the alignment tape then the automatic adjustment starts.
  - While the automatic adjustment is in progress, "Auto Adjusting..." appears on the superimposed display only.

(3) Check result of the adjustment.
  - When automatic adjustment ends with success, the message "Adjust Complete" appears on the superimposed display.
    The alignment tape is ejected automatically.
  - When the automatic adjustment ends with fail, the message "# Adjust Incomplete #" appears on the superimposed display. When this message appears, refer to "When the Automatic Adjustment Ends with Fail" described on the next page.

(4) Press the MENU (SHIFT + SET) button to exit the menu.
(5) To save the adjustment data, enter A0F : NV-RAM CONTROL and execute "SAVE SERVO ADJUST DATA".

Example of display and operation

Ex. : J-1

```
   SERVO ADJUST MODE
A0A:RF SWITCHING POS.

  Auto Adjust(Push SET)
```

(1) ⇩ SET

```
   SERVO ADJUST MODE
A0A:RF SWITCHING POS.

  Set
  SR5-1
  ALIGNMENT TAPE
```

(2) ⇩ Insert the alignment tape

```
   SERVO ADJUST MODE
A0A:RF SWITCHING POS.

  Auto Adjusting ...


   PG DATA : XXXXXX
```

⇩

```
   SERVO ADJUST MODE
A0A:RF SWITCHING POS.


  Adjust Complete


   PG DATA : XXXXXX
```

(3) ⇩ Check
(4) ⇩ MENU (SHIFT + SET)
(5) Save

```
*A0F:NV-RAM CONTROL
```

```
   SERVO ADJUST MODE
A0A:RF SWITCHING POS.


# Adjust Incomplete    #
# Servo unlock NG!     #
```

When the automatic adjustment ends with fail (example)

When the Automatic Adjustment Ends with Fail (A00 to A0A)

If the message "# Adjust Incomplete #" appears while the adjustment menu of A00 to A0A is in progress, the circuit that causes the trouble can be approximately located with the use of the trouble message that is displayed together with the above message.

Note

When the trouble message appears, it means that the circuit that is specified below has not worked correctly and the adjustment could not be executed. However, it is possible that the circuits (such as the control signal system circuit and others) other than what is specified below can be the cause of the actual failure and trouble.

A00 : A01-A09 ADJUST

Refer to the descriptions of A01 to A09.

A01 : S REEL FG DUTY

When the message "# S REEL FG ( ) NG! #" is displayed,

- Check the S reel FG amplifier circuit of the DR-432 board.
- Check the S reel motor driver circuit of the DR-432 board.

A02 : T REEL FG DUTY
A09 : T REEL QPL GAIN

When the message "# T REEL FG ( ) NG! #" is displayed,

- Check the T reel FG amplifier circuit of the DR-432 board.
- Check the T reel motor driver circuit of the DR-432 board.

A03 : CAPSTAN FG DUTY
A08 : CAPSTAN QPL GAIN

When the message "CAPSTAN FG AMP TROUBLE" is displayed,

- Check the capstan FG amplifier circuit of the DR-432 board.
- Check the capstan motor driver circuit of the DR-432 board.

A04 : S REEL OFFSET/FRICTION
A06 : S REEL TORQUE

When the message "# S REEL TROUBLE #" is displayed,

- Perform again the S reel FG duty adjustment (A01 : S REEL FG DUTY).
- Check the S reel motor driver circuit of the DR-432 board.

A05 : T REEL OFFSET/FRICTION
A07 : T REEL TORQUE

When the message "# T REEL TROUBLE #" is displayed,

- Perform again the T reel FG duty adjustment (A02 : T REEL FG DUTY).
- Check the T reel motor driver circuit of the DR-432 board.

A0A : RF SWITCHING POS.

Check first that the playback tape is the alignment tape SR5-1 or SR5-1P.

When the message "# Servo unlock NG! #" is displayed,

- Check the drum motor (C015 : DRUM MOTOR)

A0F : NV-RAM CONTROL

A0F : NV-RAM CONTROL is the menu to save the adjustment data of the servo system that is obtained by the A0 : SERVO ADJUST mode.

Note

If any abnormality occurs (i.e., when the message "# Adjust Incomplete #" is displayed) during the automatic adjustment, do not save the adjustment data in the NV-RAM.

Note

If the adjustment data is not saved by this menu, the adjustment data returns to the original data before the adjustment is attempted.

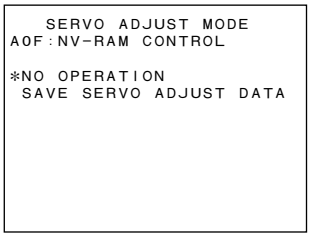
How to execute

(1) Rotate the JOG dial (or SHUTTLE ring) and move the select asterisk (*) to the message "SAVE SERVO ADJUST DATA".
(2) Press the SET button.
- When the SET button is pressed, data transfer starts. It takes about 2 seconds to complete the data transfer.
- During data transfer, the message "Saving..." appears on the superimposed display.

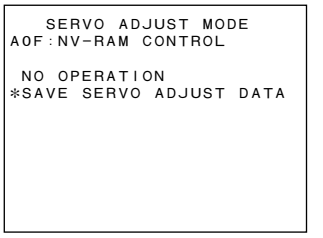
(3) Check that data transfer is complete.
- When the data transfer is complete, the message "Save Complete" appears on the superimposed display.
- When data transfer fails, the message "# Save Incomplete #" appears on the superimposed display. When this message appears, check the NV-RAM (IC301 on the DR-432 board) of the servo system.

(4) Press the MENU (SHIFT + SET) button to exit the menu.

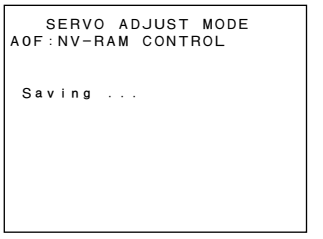
Example of display and operation



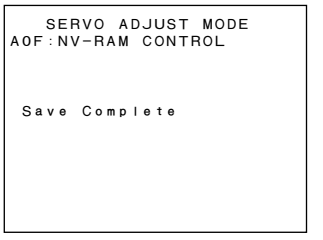
(1) ⇩ JOG Dial (↺)



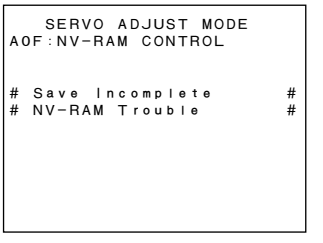
(2) ⇩ SET



⇩ About 2 seconds



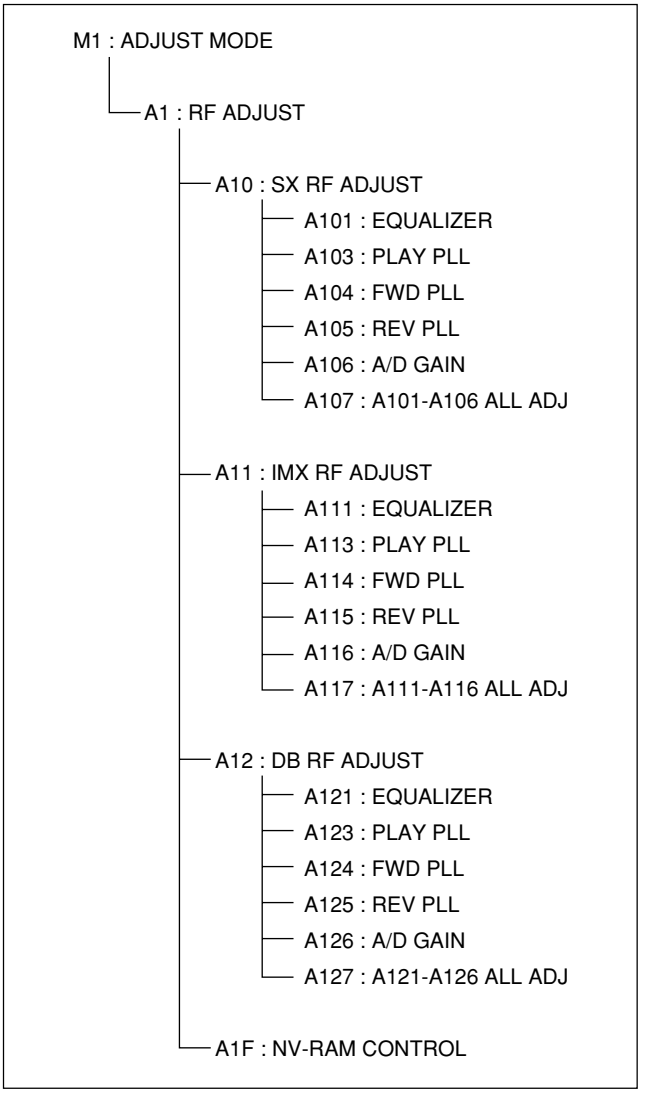
(3) ⇩ Check
(4) ⇩ MENU (SHIFT + SET)



Fails

3-3-3. RF ADJUST Mode (A1)

A1 : RF ADJUST
This is the mode that is used to adjust the RF system.
The A1 : RF ADJUST mode contains the various adjustment modes that support the respective digital recording formats and also the menus that save the adjustment data.


M1 : ADJUST MODE
A1 : RF ADJUST
A10 : SX RF ADJUST
A101 : EQUALIZER
A103 : PLAY PLL
A104 : FWD PLL
A105 : REV PLL
A106 : A/D GAIN
A107 : A101-A106 ALL ADJ
A11 : IMX RF ADJUST
A111 : EQUALIZER
A113 : PLAY PLL
A114 : FWD PLL
A115 : REV PLL
A116 : A/D GAIN
A117 : A111-A116 ALL ADJ
A12 : DB RF ADJUST
A121 : EQUALIZER
A123 : PLAY PLL
A124 : FWD PLL
A125 : REV PLL
A126 : A/D GAIN
A127 : A121-A126 ALL ADJ
A1F : NV-RAM CONTROL

Menu tree of the RF ADJUST mode

Notes

- When any abnormality occurs in the servo system, the respective menus of "A1 : RF ADJUST" do not work correctly.
- When a cassette tape that is recorded by an inappropriate format in each item is inserted, the cassette tape is ejected automatically.

A10 : SX RF ADJUST

This is the mode that is used to adjust the RF system of the Betacam SX format.

A11 : IMX RF ADJUST

(This mode is not displayed in J-1)
This is the mode that is used to adjust the RF system of the MPEG IMX format.
This mode is displayed only in the models that have the MPEG IMX playback function.

A12 : DB RF ADJUST

(This mode is not displayed in J-1 and J-2.)
This is the mode that is used to adjust the RF system of the digital Betacam format. This mode is displayed only in the models that have the digital Betacam playback function.

A1F : NV-RAM CONTROL

This is a menu to save the RF system adjustment data in the NV-RAM, that is obtained by the respective formats.

A101 : EQUALIZER
A103 : PLAY PLL
A104 : FWD PLL
A105 : REV PLL
A106 : A/D GAIN

These menus are implemented during the RF system automatic adjustment of the Betacam SX format.

Note

The examples that are displayed in the right show the status when the STOP button is being pressed.
In the actual displays, the portion marked by "xx" indicates the adjustment data.

A101 : EQUALIZER

This menu adjusts automatically the playback level (VC) of the PB heads (A and C in J-1 and A, B, C, and D in J-2/J-3) and gain (EQ) and phase (PH) of the playback equalizer.

```
     SX RF ADJUST MODE
A101:EQUALIZER

 Auto Adjust (Push SET)

 ch  RSLT    ch  RSLT
 A           B
 C           D
*ALL
```

```
     SX RF ADJUST MODE
A101:EQUALIZER

 Auto Adjust (Push SET)

 ch VC EQ PH ch VC EQ PH
 A  xx xx xx B  xx xx xx
 C  xx xx xx D  xx xx xx
*ALL
```

A103 : PLAY PLL

This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the PLAY mode. Adjusts A/C in J-1, and A/C and B/D in J-2/J-3.

```
     SX RF ADJUST MODE
A103:PLAY PLL

 Auto Adjust (Push SET)

 ch  RSLT    ch  RSLT
 A/C         B/D
*ALL
```

```
     SX RF ADJUST MODE
A103:PLAY PLL

 Auto Adjust (Push SET)

 ch   VR     ch   VR
 A/C  xx     B/D  xx
*ALL
```

A104 : FWD PLL

This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the FWD mode. Adjusts A/C in J-1, and A/C and B/D in J-2/J-3.

```
     SX RF ADJUST MODE
A104:FWD PLL

 Auto Adjust (Push SET)

 ch  RSLT    ch  RSLT
 A/C         B/D
*ALL
```

```
     SX RF ADJUST MODE
A104:FWD PLL

 Auto Adjust (Push SET)

 ch   VR     ch   VR
 A/C  xx     B/D  xx
*ALL
```

A105 : REV PLL

This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the REV mode. Adjusts A/C in J-1, and A/C and B/D in J-2/J-3.

```
     SX RF ADJUST MODE
A105:REV PLL

 Auto Adjust (Push SET)

 ch  RSLT    ch  RSLT
 A/C         B/D
*ALL
```

```
     SX RF ADJUST MODE
A105:REV PLL

 Auto Adjust (Push SET)

 ch   VR     ch   VR
 A/C  xx     B/D  xx
*ALL
```

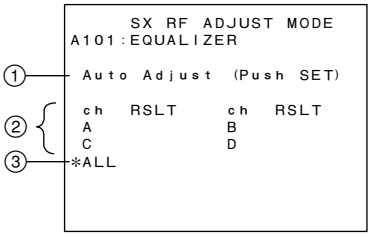
A106 : A/D GAIN

This menu adjusts automatically gain of the playback RF signal when it is converted by A/D converter. It adjusts A/C in J-1, and A/C and B/D in J-2/J-3.

```
     SX RF ADJUST MODE
A106:A/D GAIN

 Auto Adjust (Push SET)

 ch  RSLT    ch  RSLT
 A/C         B/D
*ALL
```

```
     SX RF ADJUST MODE
A106:A/D GAIN

 Auto Adjust (Push SET)

 ch   VR     ch   VR
 A/C  xx     B/D  xx
*ALL
```

Description of the superimposed display



Example of J-3 (A101 : EQUALIZER)

① The message on this line changes. The message and the meaning are described as follows.

Auto Adjust (Push SET) :	Press the SET button to start the automatic adjustment.
Waiting ... :	Preparation for the equalizer adjustment is under way.
Auto Tracking ... :	Optimization of tracking is under way.
Auto Adjusting ... :	The automatic adjustment is under way.
Auto Adjust Complete :	Automatic adjustment is complete.
Auto Adjust Incomplete :	The automatic adjustment ends with fail.
Condition NG :	The error condition is NG.
Insert SR5-1 :	Requesting insertion of alignment tape SR5-1 (for the 525 system)
Insert SR5-1P :	Requesting insertion of alignment tape SR5-1P (for the 625 system)

② When the automatic adjustment is going to be performed on each channel (1 circuit), select the desired channel with asterisk (*).
After completion of the automatic adjustment, result of the adjustment (OK, NG, and FAIL) is displayed in the right of the channel name.
When automatic adjustment ends with success, “OK” is displayed.
When the error condition is NG, “NG” is displayed.
When the automatic adjustment ends with fail, “FAIL” is displayed.

Note

“RSLT” means Result.

While the STOP button is being pressed except for adjustment, the adjustment data on each channel (circuit) keeps appearing.

Note

During adjustment, do not press the STOP button. Tape stops and adjustment cannot be performed.

③ When the automatic adjustment for all channels is going to be performed at the same time, select ALL. After completion of the automatic adjustment of all channels (all circuits), “OK” is displayed in the right of ALL if all channels (circuits) are “OK”. If even one channel (circuit) is NG or FAIL, “NG” or “FAIL” is displayed in the right of ALL. If both NG and FAIL occur at the same time, “FAIL” is displayed.

How to execute

(1) Insert the alignment tape SR5-1 (in 525 system) or SR5-1P (in 625 system).

Notes

- If any tape other than the specified alignment tape is used for this adjustment, the correct adjustment cannot be performed even though “Auto Adjust Complete” appears upon completion of adjustments.
- When the automatic adjustment is in progress, do not change the tape run mode.
  The adjustment cannot be performed correctly in any mode other than the tape run mode that has been set automatically. If status of the tape run changes, the automatic adjustment does not advance or result of the adjustment becomes “FAIL” or “NG”. It means that the automatic adjustment should not start at the near end of a tape so that the tape end/top should not be detected in the middle of adjustment. In order to execute the automatic adjustment correctly, the amount of the recorded segment that is required at a minimum is shown in the following table. However, this amount changes when abnormality occurs.

Menu	Upper : Normal adjustment time Lower : Required amount of recorded segment (in tape run mode)
A101 : EQUALIZER Ⓣ	About 60 seconds*/ALL. About 15 seconds/channel The time required for adjustment (PLAY)
A103 : PLAY PLL	About 12 seconds/ALL. About 10 seconds/circuit The time required for adjustment (PLAY)
A104 : FWD PLL	About 10 seconds About 10 minutes (FWD)
A105 : REV PLL	About 10 seconds About 11 minutes (REV)
A106 : A/D GAIN Ⓣ	About 45 seconds*/ALL. About 10 seconds/circuit The time required for adjustment (PLAY)

Tracking operation is performed in the menu with Ⓣ.
* : J-1 take half the time of J-2 and J-3.

(2) Rotate the JOG dial (or SHUTTLE ring) to select the desired channel or ALL with asterisk (*).
Select ALL normally.

(3) Press the SET button.
- Tape runs automatically and the automatic adjustment starts.
- "Auto Tracking..." (menu only that performs tracking operation) or "Auto Adjusting" appears on the superimposed display

Note

When a menu that contains the tracking operation in it is performed using ALL, result of adjustment of each channel (each circuit) is displayed whenever adjustment of one channel (circuit) is complete.
- To stop the automatic adjustment in the middle, press the MENU (SHIFT + SET) button.
- When a cassette tape is not inserted, "Insert SR5-1" (in 525 system) or "Insert SR5-1P" (in 625 system) appears on the superimposed display.
  Insert a cassette tape and the tape runs automatically. The automatic adjustment starts.

Notes
- In case that "Auto Adjust (by pushing SET)" keeps appearing on the superimposed display although the automatic adjustment starts (the SET button is pressed), it is considered that an unrecorded portion of the tape is played back. Change the playback position.
- Do not touch any button or JOG dial (or SHUTTLE ring) that affects the tape run during automatic adjustment.
  If status of the tape run changes, the adjustment cannot be performed correctly and also the automatic adjustment does not advance or result of the adjustment becomes "FAIL" or "NG".

(4) Check result of the automatic adjustment on the superimposed display.
- If no abnormality is found, "OK" appears in the right of the selected channel (circuit).
- When "Condition NG" or "Auto Adjust Incomplete" appears on the superimposed display, refer to "Condition NG/Automatic Adjustment Fails" described on page 3-52.
- Press the STOP button to check the adjustment data.

Note

"OK" or "NG", "FAIL" appear on the menu display. After completion of the ALL adjustment, rotate the JOG dial (or SHUTTLE ring) and result of the adjustment of each channel is displayed.

(5) Press the MENU (SHIFT + SET) button twice to exit the menu.
Or return to step (2) to perform again the automatic adjustment with this menu.

(6) To save the adjustment data, enter A1F : NV-RAM CONTROL and execute "SAVE ALL ADJUST DATA".
To return the adjustment data to the previous ones, enter A1F : NV-RAM CONTROL and execute "ALL DATA PREVIOUS".

Note

If any abnormality occurs (the message "Auto Adjust Incomplete" or "Condition NG" is displayed) in the automatic adjustment, do not save the adjustment data in the NV-RAM.

Example of display and operation

Example of J-3 when selecting ALL in A101 : EQUALIZER

```
     SX RX ADJUST MODE
A101:EQUALIZER

 Auto Adjust (Push SET)

 ch  RSLT     ch  RSLT
 A            B
 C            D
*ALL
```

(1) ⇩ Insert SR5-1/SR5-1P
(2) ⇩ Select
(3) ⇩ SET

```
     SX RF ADJUST MODE □
A101:EQUALIZER

 Waiting ...

 ch  RSLT     ch  RSLT
 A            B
 C            D
*ALL
```

⇩

```
     SX RF ADJUST MODE □
A101:EQUALIZER

 Auto Adjusting .......

 ch  RSLT     ch  RSLT
 A            B
 C            D
*ALL
```

⇩

```
     SX RF ADJUST MODE □
A101:EQUALIZER

 Auto Adjusting .......

 ch  RSLT     ch  RSLT
 A    OK      B
 C            D
*ALL
```

⇩
(Omitted)
⇩

```
    SX RF ADJUST MODE
A101:EQUALIZER

 Auto Adjust Complete

 ch  RSLT     ch  RSLT
 A    OK      B    OK
 C    OK      D    OK
*ALL  OK
```

(4) ⇩ Check
(5) ⇩ MENU (SHIFT + SET)
⇩ MENU (SHIFT + SET)
(6) Save

```
*A1F:NV-RAM CONTROL
```

Example of J-3 when selecting ALL in A103 : PLAY PLL

```
     SX RF ADJUST MODE
A103:PLAY PLL

 Auto Adjust (Push SET)

 ch  RSLT     ch  RSLT
 A/C          B/D
*ALL
```

(1) ⇩ Insert SR5-1/SR5-1P
(2) ⇩ Select
(3) ⇩ SET

```
     SX RF ADJUST MODE □
A103:PLAY PLL

 Waiting ...

 ch  RSLT     ch  RSLT
 A/C          B/D
*ALL
```

⇩

```
     SX RF ADJUST MODE □
A103:PLAY PLL

 Auto Adjusting

 ch  RSLT     ch  RSLT
 A/C          B/D
*ALL
```

⇩

```
    SX RF ADJUST MODE
A103:PLAY PLL

 Auto Adjust (Push SET)

 ch  RSLT     ch  RSLT
 A/C  OK      B/D  OK
*ALL  OK
```

(4) ⇩ Check
(5) ⇩ MENU (SHIFT + SET)
⇩ MENU (SHIFT + SET)
(6) Save

```
*A1F:NV-RAM CONTROL
```

A107 : A101- A106 ALL ADJUST

In this menu, the aforementioned automatic adjustment of A101 to A106 is performed in the following order.

A103 : PLAY PLL
A106 : A/D GAIN
A101 : EQUALIZER
A104 : FWD PLL
A105 : REV PLL

How to execute

(1) Insert the alignment tape SR5-1 (in 525 system) or SR5-1P (in 625 system) that has been located to the position of time code 00 : 08 : 00 : 00.

Note

Be sure to use the specified alignment tape. If any tape other than the specified alignment tape is used for this adjustment, the correct adjustment cannot be performed.

(2) Press the SET button.
- When the SET button is pressed, the automatic adjustment of the playback system starts.
- The message appears on the superimposed display in the same manner as when the single adjustment is performed. If "Condition NG" or "Auto Adjust Incomplete" does not appear, the adjustment is complete in about 5 to 6 minutes.
  When completing, the alignment tape will be rewound.

(3) Check that "Auto Adjust Complete" appears on the superimposed display.
When you want to check the adjustment data, check it from the individual menu.

Note

When an abnormality occurs in the middle of adjustment, "Condition NG" or "Auto Adjust Incomplete" appears on the superimposed display in the same manner as when the individual adjustment is performed. The automatic adjustment stops at the timing of the adjustment menu. "ALL FAIL" or "ALL NG" appears on the time data display.
- When "Condition NG" or "Auto Adjust Incomplete" appears, refer to "Condition NG/Automatic Adjustment Fails" on the next page.

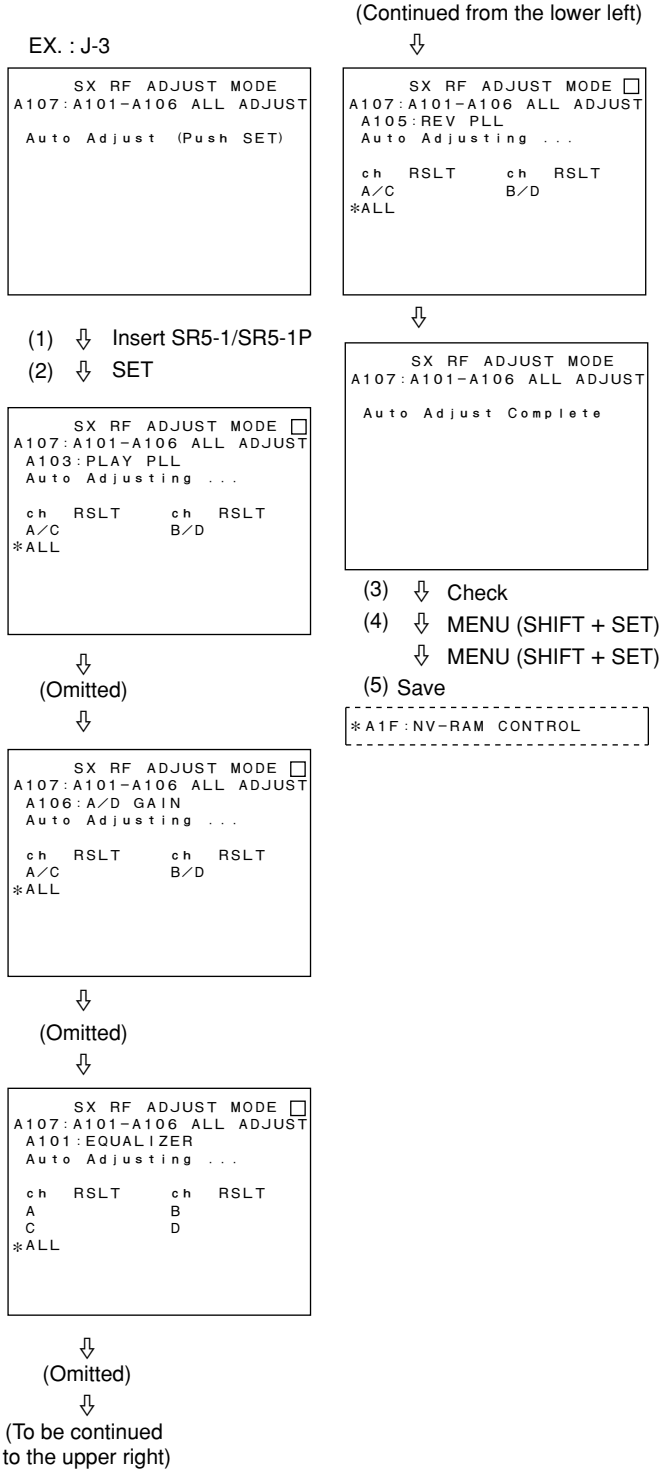
(4) Press the MENU (SHIFT + SET) button twice.
- When you want to repeat adjustment, press the MENU (SHIFT + SET) button once to exit the menu and select the menu again.

(5) To save the adjustment data, enter A1F : NV-RAM CONTROL and execute "SAVE ALL ADJUST DATA".
To return the respective adjustment data to the previous ones, enter A1F : NV-RAM CONTROL and execute "ALL DATA PREVIOUS".

Note

If any abnormality occurs (the message "Auto Adjust Incomplete" or "Condition NG" is displayed) in the automatic adjustment, do not save the adjustment data in the NV-RAM.

Example of display and operation



Condition NG/Automatic Adjustment Fails

If “Condition NG” or “Auto Adjust Incomplete” appears during execution of each adjustment menu of A101 to A107, check the followings in the order shown.

(1) Check that the specified alignment tape is used.
If the specified alignment tape is not used, use the specified alignment tape and perform the adjustment again.
525 system : SR5-1
625 system : SR5-1P

(2) Perform cleaning of the drum (video head) referring to C10 “Condition NG” in “3-2-3. RF CHECK Mode (C1)”.
If the cleaning has already been performed, it is not necessary.

(3) When “Condition NG” or “Auto Adjust Incomplete” appears in any menu other than A107 or A103, perform the automatic adjustment using the A107 Menu.
When no abnormality is found, this is the end of the check.

When “Condition NG” still appears, the following defects are suspected.

- Defective adjustment of the servo system or defective circuit
  ⇨ Readjust the servo system (A0 : SERVO ADJUST)
  ⇨ Check the servo system (C01 : MOTOR CHECK)
- Defective adjustment of the RF playback system
  ⇨ Readjust the RF system (A10 : SX RF ADJUST)
- Playback heads inside the drum assembly are worn out.
  ⇨ After confirming the protrusion amount of the video heads (referring to Section 4-3), replace the upper drum assembly or drum assembly, if necessary.
- Defective adjustment of tape run system, or defective part mounting
  ⇨ Readjust or rework.
- Defective MB-919 board
- Defective drum assembly

And, when “Auto Adjust Incomplete” appears, the following defects are suspected except above.

- Failure of the shaft ground assembly, defective installation, or defective contact
  ⇨ Replace or rework.
- Defective connection of the harness (between the drum assembly and MB-919 board)

A111 : EQUALIZER
A113 : PLAY PLL
A114 : FWD PLL
A115 : REV PLL
A116 : A/D GAIN

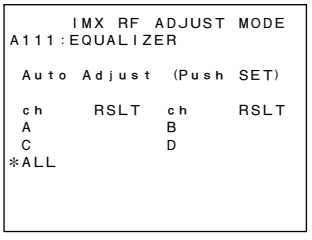
These are the dedicated menus for J-2 and J-3 and are not displayed in J-1.
These are the menus that perform the automatic adjustment for the RF system of the MPEG IMX format.

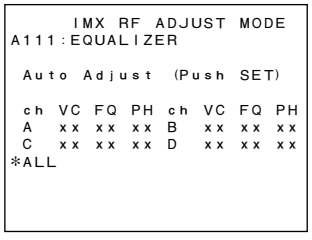
Note

The status when the STOP button is being pressed, is displayed in the right as an example.
In the actual displays, the portion marked by "xx" indicates the adjustment data.

A111 : EQUALIZER

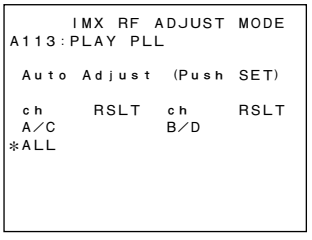
This menu adjusts automatically the playback level (VC) of the PB heads (A, B, C, and D), and also adjusts gain (EQ) and phase (PH) of the playback equalizer.

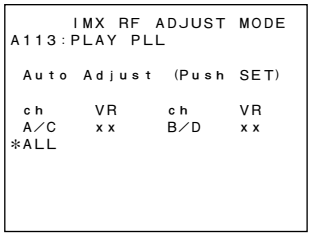




A113 : PLAY PLL

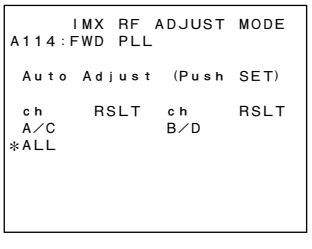
This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the PLAY mode.

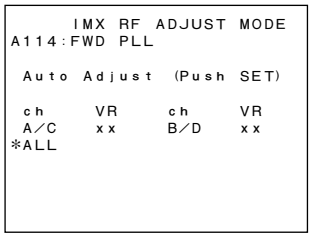




A114 : FWD PLL

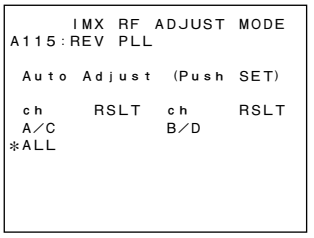
This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the FWD mode.

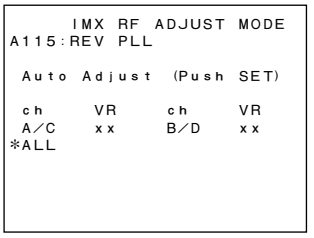




A115 : REV PLL

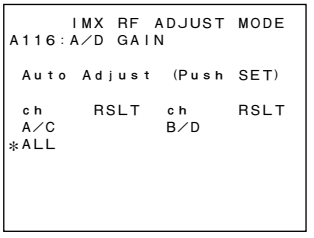
This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the REV mode.

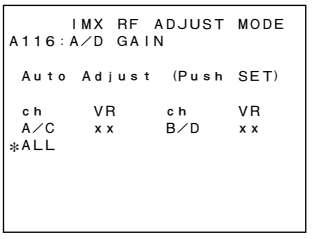




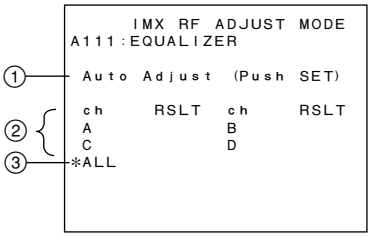
A116 : A/D GAIN

This menu adjusts automatically the gain when the playback RF signal is converted by A/D converter.





Description of the superimposed display



Example (A111: EQUALIZER)

① The message on this line changes. The message and the meaning are described as follows.

Auto Adjust (Push SET) :	Press the SET button to start the automatic adjustment.
Waiting... :	Preparation for the equalizer adjustment is under way .
Auto Tracking ... :	Optimization of tracking is under way.
Auto Adjusting ... :	The automatic adjustment is under way.
Auto Adjust Complete :	Automatic adjustment is complete.
Auto Adjust Incomplete :	The automatic adjustment ends with fail.
Condition NG :	Error condition is NG
Insert MR5-1 :	Requesting insertion of alignment tape MR5-1 (in case of 525 system)
Insert MR5-1P :	Requesting insertion of alignment tape MR5-1P (in case of 625 system)

② When the automatic adjustment is going to be performed on each channel (1 circuit), select the desired channel with asterisk (*).
After completion of the automatic adjustment, result of the adjustment (OK, NG, and FAIL) is displayed in the right of the channel name.
When automatic adjustment ends with success, “OK” is displayed.
When the error condition is NG, “NG” is displayed.
When the automatic adjustment ends with fail, “FAIL” is displayed.

Note

“RSLT” means Result.

While the STOP button is being pressed except for adjustment, the adjustment data on each channel (circuit) keeps appearing.

Note

During adjustment, do not press the STOP button. Tape stops and adjustment cannot be performed.

③ When the automatic adjustment for all channels (all circuits) is going to be performed at the same time, select ALL.
After completion of the automatic adjustment of all channels (all circuits), “OK” is displayed in the right of ALL if all channels (circuits) are “OK”. If even one channel (circuit) is NG or FAIL, “NG” or “FAIL” is displayed in the right of ALL. If both NG and FAIL occur at the same time, “FAIL” is displayed.

How to execute

(1) Insert the alignment tape MR5-1 (in 525 system) or MR5-1P (in 625 system).

Notes

- If any tape other than the specified alignment tape is used for this adjustment, the correct adjustment cannot be performed even though “Auto Adjust Complete” appears upon completion of adjustments.
- When the automatic adjustment is in progress, do not change the tape run mode.
  The adjustment cannot be performed correctly in any mode other than the tape run mode that has been set automatically. If status of the tape run changes, the automatic adjustment does not advance or result of the adjustment becomes “FAIL” or “NG”. It means that the automatic adjustment should not start at the near end of a tape so that the tape end/top should not be detected in the middle of adjustment. In order to execute the automatic adjustment correctly, the amount of the recorded segment that is required at a minimum is shown in the following table. However, this amount changes when abnormality occurs.

Menu	Upper : Normal adjustment time Lower : Required amount of recorded segment (in tape run mode)
A111 : EQUALIZER Ⓣ	About 60 seconds/ALL. About 15 seconds/channel The time required for adjustment (PLAY)
A113 : PLAY PLL	About 12 seconds/ALL. About 10 seconds/circuit The time required for adjustment (PLAY)
A114 : FWD PLL	About 10 seconds About 10 minutes (FWD)
A115 : REV PLL	About 10 seconds About 11 minutes (REV)
A116 : A/D GAIN Ⓣ	About 45 seconds/ALL. About 10 seconds/circuit The time required for adjustment (PLAY)

Tracking operation is performed in the menu with Ⓣ.

(2) Rotate the JOG dial (or SHUTTLE ring) to select the desired channel or ALL with asterisk (∗).
Select ALL normally.

(3) Press the SET button.
- Tape runs automatically and the automatic adjustment starts.
- "Auto Tracking..." (menu only that performs tracking operation) or "Auto Adjusting" appears on the superimposed display

Note

When a menu that contains the tracking operation in it is performed using ALL, result of adjustment of each channel (each circuit) is displayed whenever adjustment of one channel (circuit) is complete.

- To stop the automatic adjustment in the middle, press the MENU (SHIFT + SET) button.
- When a cassette tape is not inserted, "Insert MR5-1" (in 525 system) or "Insert MR5-1P" (in 625 system) appears on the superimposed display.
Insert a cassette tape and the tape runs automatically. The automatic adjustment starts.

Notes

- In case that "Auto Adjust (by pushing SET)" keeps appearing on the superimposed display although the automatic adjustment starts (the SET button is pressed), it is considered that an unrecorded portion of the tape is played back. Change the playback position.
- Do not touch any button or JOG dial (or SHUTTLE ring) that affects the tape run during automatic adjustment.
If status of the tape run changes, the adjustment cannot be performed correctly and also the automatic adjustment does not advance or result of the adjustment becomes "FAIL" or "NG".

(4) Confirm result of the automatic adjustment on the superimposed display.
- If no abnormality is found, "OK" appears in the right of the selected channel (circuit).
- When "Condition NG" or "Auto Adjust Incomplete" is shown on the superimposed display, refer to "Condition NG/Automatic Adjustment Fails" described on page 3-58.
- Press the STOP button to check the adjustment data.

Note

"OK" or "NG or "FAIL" appears on the menu display.
When the ALL adjustment is complete, rotate the JOG dial (or SHUTTLE ring) and result of the adjustment of each channel is displayed.

(5) Press the MENU (SHIFT + SET) button twice to exit the menu.
Or, return to step (2) to perform again the automatic adjustment with this menu.

(6) To save the adjustment data, enter A0F : NV-RAM CONTROL and execute "SAVE ALL ADJUST DATA".
To return the adjustment data to the previous ones, enter A0F : NV-RAM CONTROL and execute "ALL DATA PREVIOUS".

Note

If any abnormality occurs (the message "Auto Adjust Incomplete" or "Condition NG" is displayed) in the automatic adjustment, do not save the adjustment data in the NV-RAM.

Example of display and operation

Example when selecting
ALL with A111 : EQUALIZER

```
     IMX RF ADJUST MODE
A111:EQUALIZER

 Auto Adjust (Push SET)

 ch     RSLT   ch     RSLT
 A             B
 C             D
*ALL
```

(1) ⇩ Insert MR5-1/MR5-1P
(2) ⇩ JOG dial
(3) ⇩ SET

```
     IMX RF ADJUST MODE□
A111:EQUALIZER

 Waiting ...

 ch     RSLT   ch     RSLT
 A             B
 C             D
*ALL
```

⇩

```
     IMX RF ADJUST MODE□
A111:EQUALIZER

 Auto Adjusting ...

 ch     RSLT   ch     RSLT
 A             B
 C             D
*ALL
```

⇩

```
     IMX RF ADJUST MODE□
A111:EQUALIZER

 Auto Adjusting ...

 ch     RSLT   ch     RSLT
 A             B
 C             D
*ALL
```

⇩
(Omitted)
⇩

```
     IMX RF ADJUST MODE
A111:EQUALIZER

 Auto Adjust Complete

 ch     RSLT   ch     RSLT
 A             B
 C             D
*ALL
```

(4) ⇩ Check
(5) ⇩ MENU (SHIFT + SET)
⇩ MENU (SHIFT + SET)
(6) Save

```
*A1F:NV-RAM CONTROL
```

Example when selecting
ALL with A113 : PLAY PLL

```
     IMX RF ADJUST MODE
A113:PLAY PLL

 Auto Adjust (Push SET)

 ch     RSLT   ch     RSLT
 A/C           B/D
*ALL
```

(1) ⇩ Insert MR5-1/MR5-1P
(2) ⇩ JOG dial
(3) ⇩ SET

```
     IMX RF ADJUST MODE□
A113:PLAY PLL

 Waiting ...

 ch     RSLT   ch     RSLT
 A/C           B/D
*ALL
```

⇩

```
     IMX RF ADJUST MODE□
A113:PLAY PLL

 Auto Adjusting ...

 ch     RSLT   ch     RSLT
 A/C           B/D
*ALL
```

⇩

```
     IMX RF ADJUST MODE
A113:PLAY PLL

 Auto Adjust (Push SET)

 ch     RSLT   ch     RSLT
 A/C           B/D
*ALL
```

(4) ⇩ Check
(5) ⇩ MENU (SHIFT + SET)
⇩ MENU (SHIFT + SET)
(6) Save

```
*A1F:NV-RAM CONTROL
```

A117 : A111-A116 ALL ADJUST

These are the dedicated menus for J-2 and J-3 and are not displayed in J-1.
In this menu, the aforementioned automatic adjustment of A111 to A116 is performed in the following order.

A113 : PLAY PLL
A116 : A/D GAIN
A111 : EQUALIZER
A114 : FWD PLL
A115 : REV PLL

How to execute

(1) Insert the alignment tape MR5-1 (in 525 system) or MR5-1P (in 625 system) that has been rewound to the tape top.

Note

Be sure to use the specified alignment tape. If any tape other than the specified alignment tape is used for this adjustment, the correct adjustment cannot be performed.

(2) Press the SET button.
- When the SET button is pressed, the automatic adjustment of the playback system starts.
- The message appears on the superimposed display in the same manner as when the single adjustment is performed. If "Condition NG" or "Auto Adjust Incomplete" does not occur, the adjustment will complete in about 5 to 6 minutes.
  When completing, the alignment tape will be rewound.

(3) Confirm that "Auto Adjust Complete" appears on the superimposed display.
- When you want to check the adjustment data, check it from the individual menu.

Note

When an abnormality occurs in the middle of adjustment, "Condition NG" or "Auto Adjust Incomplete" appears on the superimposed display in the same manner as when the individual adjustment is performed. The automatic adjustment stops at the timing of the adjustment menu.
- When "Condition NG" or "Auto Adjust Incomplete" appears, refer to "Condition NG/Automatic Adjustment Fails" on the next page.

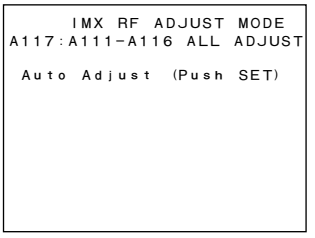
(4) Press the MENU (SHIFT + SET) button twice.
- When you want to repeat adjustment, press the MENU (SHIFT + SET) button once to exit the menu and select the menu again.

(5) To save the adjustment data, enter A1F : NV-RAM CONTROL and execute "SAVE ALL ADJUST DATA".
To return the adjustment data to the previous ones, enter A1F : NV-RAM CONTROL and execute "ALL DATA PREVIOUS".

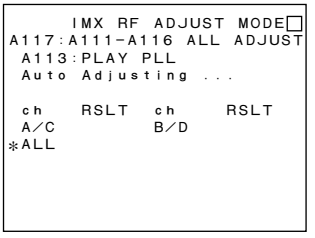
Note

If any abnormality occurs (the message "Auto Adjust Incomplete" or "Condition NG" is displayed) in the automatic adjustment, do not save the adjustment data in the NV-RAM.

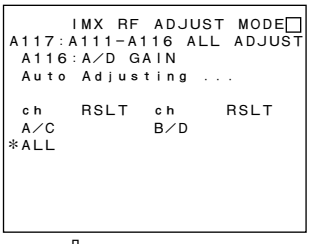
Example of display and operation



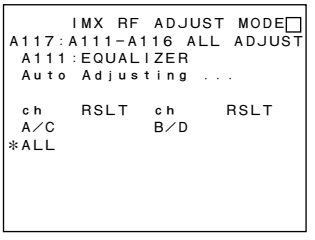
(1) ⇩ Insert MR5-1/MR5-1P
(2) ⇩ SET



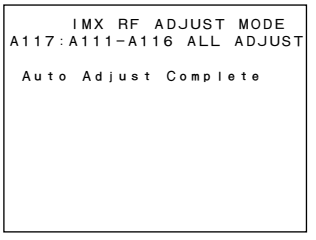
⇩
(Omitted)
⇩



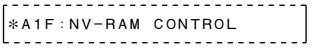
⇩
(Omitted)
⇩



⇩
(Omitted)
⇩



(3) ⇩ Check
(4) ⇩ MENU (SHIFT + SET)
⇩ MENU (SHIFT + SET)
(5) Save



Condition NG/Automatic Adjustment Fails

If “Condition NG” or “Auto Adjust Incomplete” appears during execution of each adjustment menu of A111 to A117, check the followings in the order shown.

(1) Check that the specified alignment tape is used.
If the specified alignment tape is not used, use the specified alignment tape and perform the adjustment again.
525 system : MR5-1
625 system : MR5-1P
(2) Perform cleaning of the drum (video head) referring to C11 “Condition NG” in “3-2-3. RF CHECK Mode (C1)”.
If the cleaning has already been performed, it is not necessary.
(3) When “Condition NG” or “Auto Adjust Incomplete” appears in any menu other than A117 or A113, perform the automatic adjustment using the A117 menu.
When no abnormality is found, this is the end of the adjustment.

When “Condition NG” still appears, the following defects are suspected.

- Defective adjustment of the servo system or defective circuit
  ⇨ Readjust the servo system (A0 : SERVO ADJUST)
  ⇨ Check the servo system (C01 : MOTOR CHECK)
- Defective adjustment of the RF playback system
  ⇨ Readjust the RF system (A11 : IMX RF ADJUST)
- Playback heads inside the drum assembly are worn out.
  ⇨ After confirming the protrusion amount of the video heads (referring to Section 4-3), replace the upper drum assembly or drum assembly, if necessary.
- Defective adjustment of tape run system, or defective part mounting
  ⇨ Readjust or rework.
- Defective MB-919 board
- Defective drum assembly

And, when “Auto Adjust Incomplete” appears, the following defects are suspected except above.

- Failure of the shaft ground assembly, defective installation, or defective contact
  ⇨ Replace or rework.
- Defective connection of the harness (between the drum assembly and MB-919 board)

A121 : EQUALIZER
A123 : PLAY PLL
A124 : FWD PLL
A125 : REV PLL
A126 : A/D GAIN

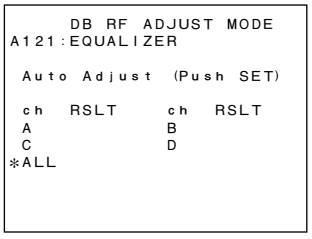
These are the dedicated menus for J-3 and are not displayed in J-1 and J-2.
These are the menus that perform the automatic adjustment for the RF system of the digital Betacam format.

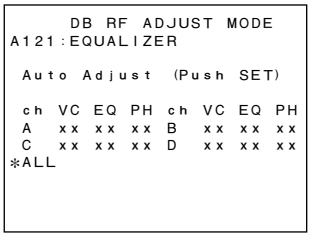
Note

The status when the STOP button is being pressed, is displayed in the right as an example.
In the actual displays, the portion marked by "xx" indicates the adjustment data.

A121 : EQUALIZER

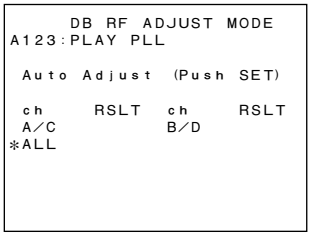
This menu adjusts automatically the playback level (VC) for the PB heads (A, B, C, and D) and gain (EQ) and phase (PH) of the playback equalizer.

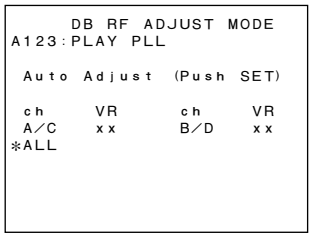




A123 : PLAY PLL

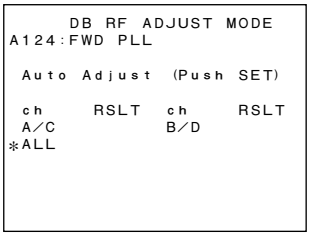
This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the PLAY mode.

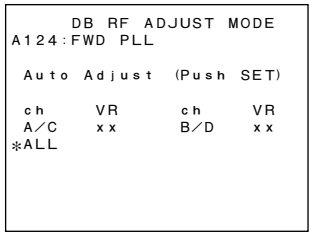




A124 : FWD PLL

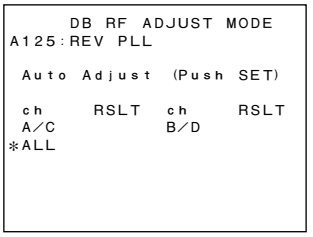
This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the FWD mode.

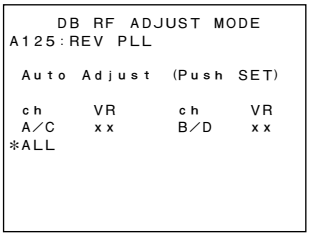




A125 : REV PLL

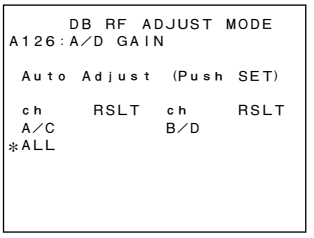
This menu adjusts automatically the VCO free-run frequency of the playback PLL circuit for the REV mode.

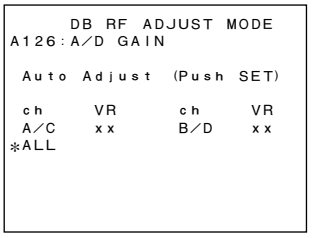




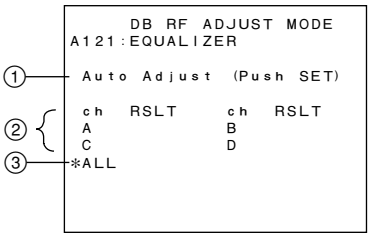
A126 : A/D GAIN

This menu adjusts automatically the gain when the playback RF signal is converted by A/D converter.





Description of the superimposed display



Example (A121 : EQUALIZER)

① The message on this line changes. The message and the meaning are described as follows.

Auto Adjust (Push SET) :	Press the SET button to start the automatic adjustment.
Waiting ... :	Preparation for the equalizer adjustment is under way.
Auto Tracking ... :	Optimization of tracking is under way.
Auto Adjusting ... :	The automatic adjustment is under way.
Auto Adjust Complete :	Automatic adjustment is complete.
Auto Adjust Incomplete :	The automatic adjustment ends with fail.
Condition NG :	Error condition is NG
Insert ZR5-1 :	Requesting insertion of alignment tape ZR5-1 (in case of 525 system)
Insert ZR5-1P :	Requesting insertion of alignment tape ZR5-1P (in case of 625 system)

② When the automatic adjustment is going to be performed on each channel (1 circuit), select the desired channel with asterisk (*).
After completion of the automatic adjustment, result of the adjustment (OK, NG, and FAIL) is displayed in the right of the channel name.
When automatic adjustment ends with success, "OK" is displayed.
When the error condition is NG, "NG" is displayed.
When the automatic adjustment ends with fail, "FAIL" is displayed.

Note

"RSLT" means Result.

While the STOP button is being pressed except for adjustment, the adjustment data on each channel (circuit) keeps appearing.

Note

During adjustment, do not press the STOP button. Tape stops and adjustment cannot be performed.

③ When the automatic adjustment for all channels (all circuits) is going to be performed at the same time, select ALL.
After completion of the automatic adjustment of all channels (all circuits), "OK" is displayed in the right of ALL if all channels (circuits) are "OK". If even one channel (circuit) is NG or FAIL, "NG" or "FAIL" is displayed in the right of ALL. If both NG and FAIL occur at the same time, "FAIL" is displayed.

How to execute

(1) Insert the alignment tape ZR5-1 (in 525 system) or ZR5-1P (in 625 system).

Notes

- If any tape other than the specified alignment tape is used for this adjustment, the correct adjustment cannot be performed even though "Auto Adjust Complete" appears upon completion of adjustments.
- When the automatic adjustment is in progress, do not change the tape run mode.
  The adjustment cannot be performed correctly in any mode other than the tape run mode that has been set automatically. If status of the tape run changes, the automatic adjustment does not advance or result of the adjustment becomes "FAIL" or "NG". It means that the automatic adjustment should not start at the near end of a tape so that the tape end/top should not be detected in the middle of adjustment. In order to execute the automatic adjustment correctly, the amount of the recorded segment that is required at a minimum is shown in the following table. However, this amount changes when abnormality occurs.

Menu	Upper : Normal adjustment time Lower : Required amount of recorded segment (in tape run mode)
A121 : EQUALIZER Ⓣ	About 60 seconds/ALL. About 15 seconds/channel The time required for adjustment (PLAY)
A123 : PLAY PLL	About 12 seconds/ALL. About 10 seconds/circuit The time required for adjustment (PLAY)
A124 : FWD PLL	About 10 seconds About 10 minutes (FWD)
A125 : REV PLL	About 10 seconds About 11 minutes (REV)
A126 : A/D GAIN Ⓣ	About 45 seconds/ALL. About 10 seconds/circuit The time required for adjustment (PLAY)

Tracking operation is performed in the menu with Ⓣ.

(2) Rotate the JOG dial (or SHUTTLE ring) to select the desired channel or ALL with asterisk (∗).
Select ALL normally.

(3) Press the SET button.
- Tape runs automatically and the automatic adjustment starts.
- "Auto Tracking..." (menu only that performs tracking operation) or "Auto Adjusting" appears on the superimposed display

Note

When a menu that contains the tracking operation in it is performed using ALL, result of adjustment of each channel (each circuit) is displayed whenever adjustment of one channel (circuit) is complete.
- To stop the automatic adjustment in the middle, press the MENU (SHIFT + SET) button.
- When a cassette tape is not inserted, "Insert ZR5-1" (in 525 system) or "Insert ZR5-1P" (in 625 system) appears on the superimposed display.
Insert a cassette tape and the tape runs automatically. The automatic adjustment starts.

Notes
- In case that "Auto Adjust (by pushing SET)" keeps appearing on the superimposed display although the automatic adjustment starts (the SET button is pressed), it is considered that an unrecorded portion of the tape is played back. Change the playback position.
- Do not touch any button or JOG dial (or SHUTTLE ring) that affects the tape run during automatic adjustment.
If status of the tape run changes, the adjustment cannot be performed correctly and also the automatic adjustment does not advance or result of the adjustment becomes "FAIL" or "NG".

(4) Confirm result of the automatic adjustment on the superimposed display.
- If no abnormality is found, "OK" appears in the right of the selected channel (circuit).
- When "Condition NG" or "Auto Adjust Incomplete" is shown on the superimposed display, refer to "Condition NG/Automatic Adjustment Fails" described on page 3-64.
- Press the STOP button to check the adjustment data.

Note

"OK" or "NG or "FAIL" appears on the menu display. When the ALL adjustment is complete, rotate the JOG dial (or SHUTTLE ring) and result of the adjustment of each channel (circuit) is displayed.

(5) Press the MENU (SHIFT + SET) button twice to exit the menu.
Or, return to step (2) to perform again the automatic adjustment with this menu.

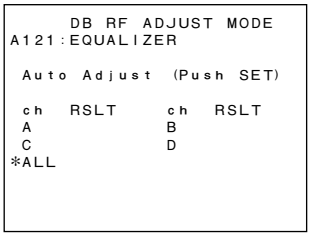
(6) To save the adjustment data, enter A1F : NV-RAM CONTROL and execute "SAVE ALL ADJUST DATA".
To return the adjustment data to the previous ones, enter A1F : NV-RAM CONTROL and execute "ALL DATA PREVIOUS".

Note

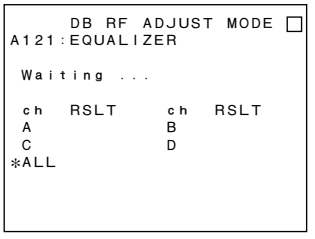
If any abnormality occurs (the message "Auto Adjust Incomplete" or "Condition NG" is displayed) in the automatic adjustment, do not save the adjustment data in the NV-RAM.

Example of display and operation

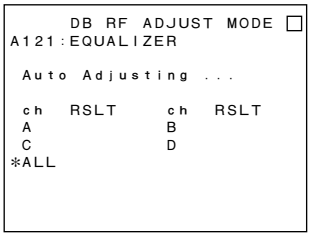
Example when selecting
ALL with A121 : EQUALIZER



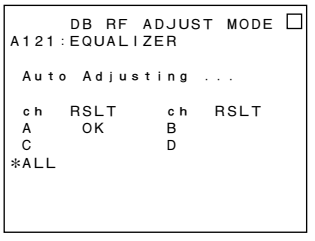
(1) ⇩ Insert ZR5-1/ZR5-1P
(2) ⇩ Select
(3) ⇩ SET



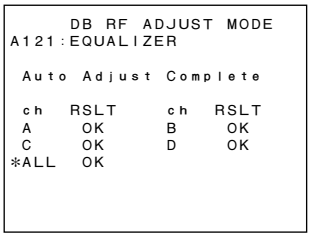
⇩



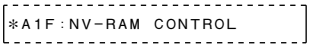
⇩



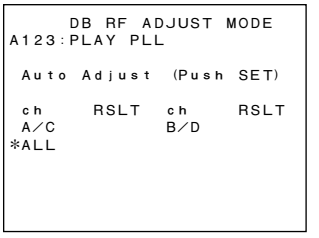
⇩
(Omitted)
⇩



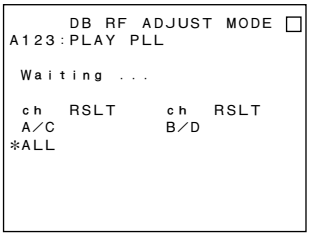
(4) ⇩ Check
(5) ⇩ MENU (SHIFT + SET)
⇩ MENU (SHIFT + SET)
(6) Save



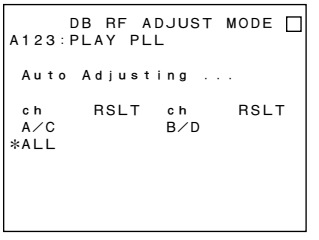
Example when selecting
ALL with A123 : PLAY PLL



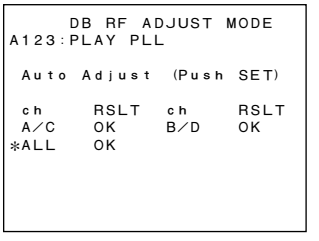
(1) ⇩ Insert ZR5-1/ZR5-1P
(2) ⇩ Select
(3) ⇩ SET



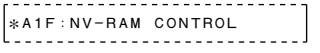
⇩



⇩



(4) ⇩ Check
(5) ⇩ MENU (SHIFT + SET)
⇩ MENU (SHIFT + SET)
(6) Save



A127 : A121-A126 ALL ADJUST

These are the dedicated menus for J-3 and are not displayed in J-1 and J-2.
In this menu, the aforementioned automatic adjustment of A121 to A126 is performed in the following order.

A123 : PLAY PLL
A126 : A/D GAIN
A121 : EQUALIZER
A124 : FWD PLL
A125 : REV PLL

How to execute

(1) Insert the alignment tape ZR5-1 (in 525 system) or ZR5-1P (in 625 system) that has been rewound to the tape top.

Note

Be sure to use the specified alignment tape. If any tape other than the specified alignment tape is used for this adjustment, the correct adjustment cannot be performed.

(2) Press the SET button.
- When the SET button is pressed, the automatic adjustment of the playback system starts.
- The message appears on the superimposed display in the same manner as when the single adjustment is performed. If "Condition NG" or "Auto Adjust Incomplete" does not occur, the adjustment will complete in about 5 to 6 minutes.
  When completing, the alignment tape will be rewound.

(3) Confirm that "Auto Adjust Complete" appears on the superimposed display.
When you want to check the adjustment data, check it from the individual menu.

Note

When an abnormality occurs in the middle of adjustment, "Condition NG" or "Auto Adjust Incomplete" appears on the superimposed display in the same manner as when the individual adjustment is performed. The automatic adjustment stops at the adjustment menu. "ALL FAIL" or "ALL NG" appears on the time data display.
- When "Condition NG" or "Auto Adjust Incomplete" appears, refer to "Condition NG/Automatic Adjustment Fails" on the next page.

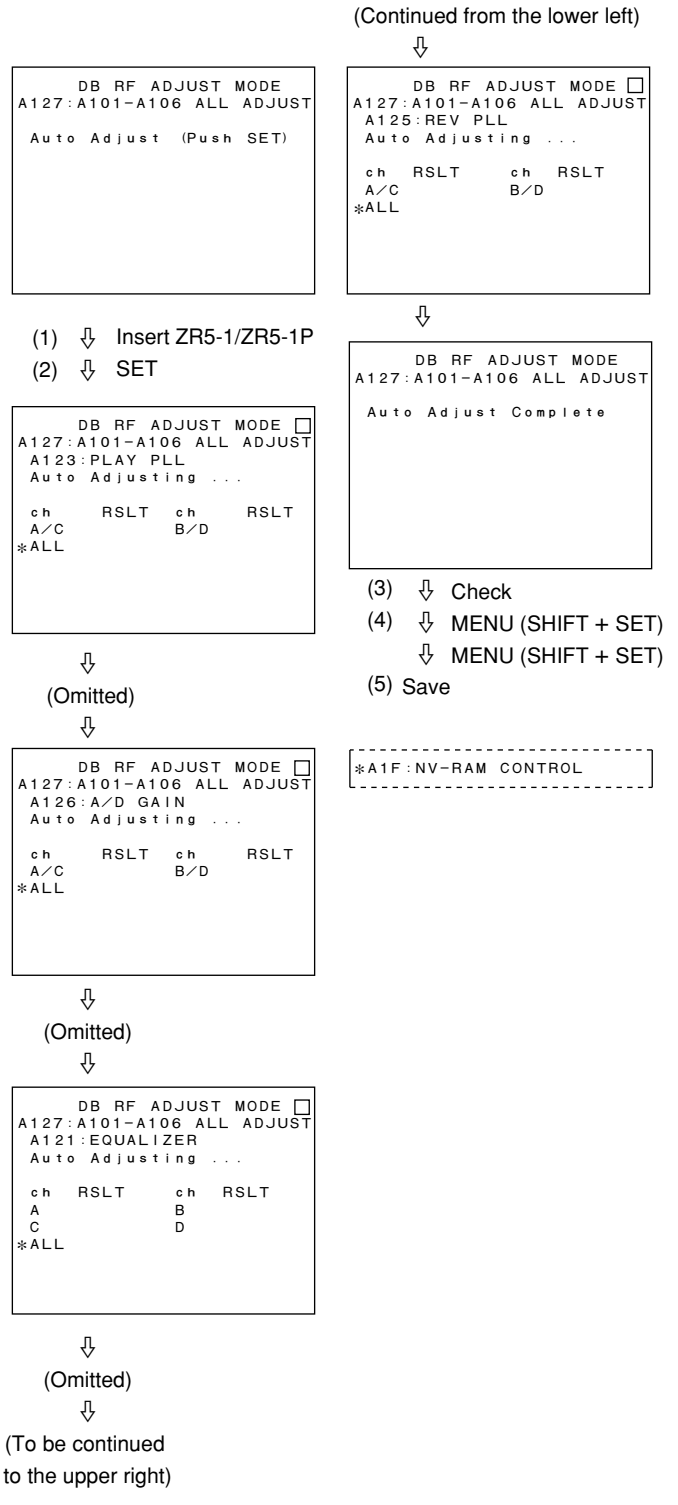
(4) Press the MENU (SHIFT + SET) button twice.
- When you want to repeat adjustment, press the MENU (SHIFT + SET) button once to exit the menu and select the menu again.

(5) To save the adjustment data, enter A1F : NV-RAM CONTROL and execute "SAVE ALL ADJUST DATA".
To return the adjustment data to the previous ones, enter A1F : NV-RAM CONTROL and execute "ALL DATA PREVIOUS".

Note

If any abnormality occurs (the message "Auto Adjust Incomplete" or "Condition NG" is displayed) in the automatic adjustment, do not save the adjustment data in the NV-RAM.

Example of display and operation



Condition NG/Automatic Adjustment Fails

If "Condition NG" or "Auto Adjust Incomplete" appears during execution of each adjustment menu of A121 to A127, check the followings in the order shown.

(1) Check that the specified alignment tape is used.
If the specified alignment tape is not used, use the specified alignment tape and perform the adjustment again.
525 system : ZR5-1
625 system : ZR5-1P

(2) Perform cleaning of the drum (video head) referring to C12 "Condition NG" in "3-2-3. RF CHECK Mode (C1)".
If the cleaning has already been performed, it is not necessary.

(3) When "Condition NG" or "Auto Adjust Incomplete" appears in any menu other than A127 or A123, perform the automatic adjustment using the A127 menu.
When no abnormality is found, this is the end of the check.

When "Condition NG" still appears, the following defects are suspected.

- Defective adjustment of the servo system or defective circuit
  ⇨ Readjust the servo system (A0 : SERVO ADJUST)
  ⇨ Check the servo system (C01 : MOTOR CHECK)
- Defective adjustment of the RF playback system
  ⇨ Readjust the RF system (A12 : DB RF ADJUST)
- Playback heads inside the drum assembly are worn out.
  ⇨ After confirming the protrusion amount of the video heads (referring to Section 4-3), replace the upper drum assembly or drum assembly, if necessary.
- Defective adjustment of tape run system, or defective part mounting
  ⇨ Readjust or rework.
- Defective MB-919 board
- Defective drum assembly

And, when "Auto Adjust Incomplete" appears, the following defects are suspected except above.

- Failure of the shaft ground assembly, defective installation, or defective contact
  ⇨ Replace or rework.
- Defective connection of the harness (between the drum assembly and MB-919 board)

A1F : NV-RAM CONTROL

This is the menu to save the adjustment data of the adjusted RF system in the NV-RAM.
The contents of all of the adjusted items with different formats can be saved altogether at the same time.
If "ALL DATA PREVIOUS" is executed before the contents are saved in the NV-RAM, all the adjustment data of the RF system are returned to the status before adjustment.

Note

If any abnormality occurs (the message "Auto Adjust Incomplete" or "Condition NG" is displayed) in the automatic adjustment, do not save the adjustment data in the NV-RAM.

Notes

- When saving the adjustment data, only the value of the item on which the adjustment is completed, is overwritten.
- When the adjustment data is not saved in this menu and if the power of the machine is turned off, the adjustment data returns to the data before the adjustment.

How to execute

(1) Rotate the JOG dial (or SHUTTLE ring) to move the asterisk (*) mark as follows on the superimposed display.
  - When saving the adjustment data upon completion of adjustment :
    ⇨ "SAVE ALL ADJUST DATA"
  - When returning to the original data before adjustment :
    ⇨ "ALL DATA PREVIOUS"

(2) Press the SET button.
  - When the SET button is pressed, data transfer starts.
  - During data transfer, the message "Saving..." or "Loading..." appears on the superimposed display.

(3) Confirm that data transfer is complete.
  - When the data transfer is complete, the message "Save Complete" or "Load Complete" appears on the superimposed display. "Save Comp" or "Load Comp" appears on the menu display.

(4) Press the MENU (SHIFT + SET) button to exit the menu.

Example of display and operation

When saving

```
    RF ADJUST MODE
A1F:NV-RAM CONTROL

*NO OPERATION
 SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(1) ⇩ JOG dial

```
    RF ADJUST MODE
A1F:NV-RAM CONTROL

 NO OPERATION
*SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(2) ⇩ SET

```
    RF ADJUST MODE
A1F:NV-RAM CONTROL

 Saving ..
```

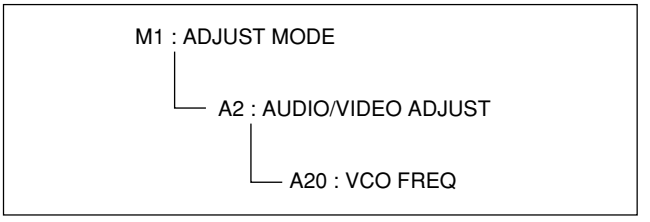
⇩

```
    RF ADJUST MODE
A1F:NV-RAM CONTROL

 Save Complete
```

(3) ⇩ Check
(4) ⇩ MENU (SHIFT + SET)

3-3-4. AUDIO/VIDEO ADJUST Mode (A2)

A2 : AUDIO/VIDEO ADJUST
This is the adjustment mode of the audio and video systems.
This mode contains a single menu.

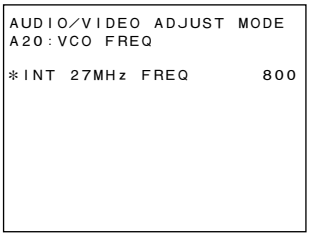


Menu tree of the AUDIO/VIDEO ADJUST mode

Note

If the adjustment data is changed carelessly, it may cause trouble. Follow the adjustment method described in "8-6-3. 27 MHz VCO Free-Run Frequency Adjustment" to perform the adjustment.
When the adjustment data is changed carelessly, turn off the power without performing "PUSH SET BUTTON".

A20 : VCO FREQ



This is the menu to adjust the reference signal system of the MB-919 board.
This menu can be executed by manual operation only.

Adjustment item	Description
INT 27 MHz FREQ	Free-run frequency of internal reference signal 27 MHz

To change the adjustment data

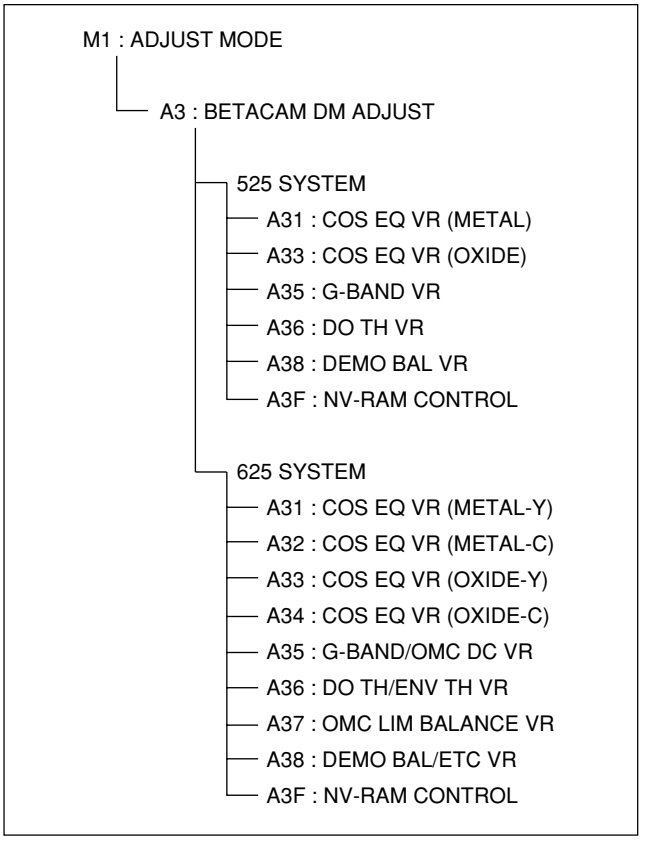
While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) to increase or decrease the adjustment data.
When the adjustment data changes, "Push SET button" appears on the superimposed display.

To save the adjustment data

Press the SET button when "Push SET button" is displayed.

3-3-5. BETACAM DM ADJUST Mode (A3)

A3 : BETACAM DM ADJUST
This is the mode that is used to adjust the playback system of the Betacam and Betacam SP formats.
The contents of the menu are different in the 525 system and 625 system.


M1 : ADJUST MODE
A3 : BETACAM DM ADJUST
525 SYSTEM
A31 : COS EQ VR (METAL)
A33 : COS EQ VR (OXIDE)
A35 : G-BAND VR
A36 : DO TH VR
A38 : DEMO BAL VR
A3F : NV-RAM CONTROL
625 SYSTEM
A31 : COS EQ VR (METAL-Y)
A32 : COS EQ VR (METAL-C)
A33 : COS EQ VR (OXIDE-Y)
A34 : COS EQ VR (OXIDE-C)
A35 : G-BAND/OMC DC VR
A36 : DO TH/ENV TH VR
A37 : OMC LIM BALANCE VR
A38 : DEMO BAL/ETC VR
A3F : NV-RAM CONTROL

Menu tree of the BETACAM DM ADJUST mode

Note

If the adjustment data is changed carelessly, it may cause trouble. Follow the adjustment method described in "8-8. Analog Betacam Playback Block Adjustment" to perform the adjustment.
When the adjustment data is changed carelessly, turn off the power without selecting A3F : NV-RAM CONTROL. Never execute "SAVE ALL ADJUST DATA".

To change the adjustment data by manual operation

(1) On the superimposed display, rotate the JOG dial (or SHUTTLE ring) to select the adjustment item with asterisk (*).
On the time data display, rotate the JOG dial (or SHUTTLE ring) and display the desired adjustment item.
(2) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) then the adjustment data increases or decreases.

To save the adjustment data

Enter A3F : NV-RAM CONTROL and execute "SAVE ALL ADJUST DATA".

A31 : COS EQ VR (METAL-Y) (625 system)

```
BETACAM DM ADJUST MODE
A31:COS EQ VR(METAL-Y)

*EQ1   METAL-Y-A       55
 EQ1   METAL-Y-B       55
 MAIN METAL-Y-A        55
 MAIN METAL-Y-B        55
 SUB   METAL-Y-A       55
 SUB   METAL-Y-B       55
```

A31 : COS EQ VR (METAL) (525 system)

```
BETACAM DM ADJUST MODE
A31:COS EQ VR(METAL)

*EQ1   METAL-Y-A       55
 EQ1   METAL-Y-B       55
 SUB   METAL-Y-A       55
 SUB   METAL-Y-B       55
 EQ1   METAL-C-A       55
 EQ1   METAL-C-B       55
 SUB   METAL-C-A       55
 SUB   METAL-C-B       55
```

A32 : COS EQ VR (METAL-C) (625 system)

```
BETACAM DM ADJUST MODE
A32:COS EQ VR(METAL-C)

*EQ1   METAL-C-A       55
 EQ1   METAL-C-B       55
 MAIN METAL-C-A        55
 MAIN METAL-C-B        55
 SUB   METAL-C-A       55
 SUB   METAL-C-B       55
```

These menus adjust the frequency response of the primary cosine equalizer and secondary cosine equalizer (main and sub) of the DM-124 board for the metal tape.

A33 : COS EQ VR (OXIDE-Y) (625 system)

```
BETACAM DM ADJUST MODE
A33:COS EQ VR(OXIDE-Y)

*EQ1   OXIDE-Y-A       55
 EQ1   OXIDE-Y-B       55
 MAIN OXIDE-Y-A        55
 MAIN OXIDE-Y-B        55
 SUB   OXIDE-Y-A       55
 SUB   OXIDE-Y-B       55
```

A33 : COS EQ VR (OXIDE) (525 system)

```
BETACAM DM ADJUST MODE
A33:COS EQ VR(OXIDE)

*EQ1   OXIDE-Y-A       55
 EQ1   OXIDE-Y-B       55
 SUB   OXIDE-Y-A       55
 SUB   OXIDE-Y-B       55
 EQ1   OXIDE-C-A       55
 EQ1   OXIDE-C-B       55
 SUB   OXIDE-C-A       55
 SUB   OXIDE-C-B       55
```

A34 : COS EQ VR (OXIDE-C) (625 system)

```
BETACAM DM ADJUST MODE
A34:COS EQ VR(OXIDE-C)

*EQ1   OXIDE-C-A       55
 EQ1   OXIDE-C-B       55
 MAIN OXIDE-C-A        55
 MAIN OXIDE-C-B        55
 SUB   OXIDE-C-A       55
 SUB   OXIDE-C-B       55
```

These menus adjust the frequency response of the primary cosine equalizer and secondary cosine equalizer (main and sub) of the DM-124 board for the oxide tape.

A35 : G-BAND/OMC DC VR (625 system)

```
BETACAM DM ADJUST MODE
A35:G-BAND/OMC DC VR

*GUARD BAND METAL-Y   22
 GUARD BAND METAL-C   1A
 GUARD BAND OXIDE-Y   26
 GUARD BAND OXIDE-C   2F
 OMC DC METAL-Y       E4
 OMC DC METAL-C       D0
 OMC DC OXIDE-Y       D0
 OMC DC OXIDE-C       D0
```

A35 : G-BAND VR (525 system)

```
BETACAM DM ADJUST MODE
A35:G-BAND VR

*GUARD BAND METAL-Y   22
 GUARD BAND METAL-C   1A
 GUARD BAND OXIDE-Y   26
 GUARD BAND OXIDE-C   2F
```

This menu adjusts the guard band width and sets the DC offset level of the over-modulation correction circuit.

A36 : DO TH/ENV TH VR (625 system)

```
BETACAM DM ADJUST MODE
A36:DO TH/ENV TH VR

*DO TH METAL-Y        1A
 DO TH METAL-C        12
 DO TH OXIDE-Y        2E
 DO TH OXIDE-C        27
 ENV-TH-A             20
 ENV-TH-B             10
```

A36 : DO TH VR (525 system)

```
BETACAM DM ADJUST MODE
A36:DO TH VR

*DO TH METAL-Y        1A
 DO TH METAL-C        12
 DO TH OXIDE-Y        2E
 DO TH OXIDE-C        27
```

This menu adjusts the drop-out threshold level and sets the RF envelope threshold level.

Note

The RF envelope threshold level of the upper (A) limit and of the lower (B) limit can be set separately.

A37 : OMC LIM BALANCE VR (625 system only)

```
BETACAM DM ADJUST MODE
A37:OMC LIM BALANCE VR

*OMC LIM METAL-Y-A    55
 OMC LIM METAL-Y-B    55
 OMC LIM METAL-C-A    55
 OMC LIM METAL-C-B    55
 OMC LIM OXIDE-Y-A    55
 OMC LIM OXIDE-Y-B    55
 OMC LIM OXIDE-C-A    55
 OMC LIM OXIDE-C-B    55
```

This menu adjusts the limiter balance of the playback RF signal.

Note

This menu described for 625 system and not displayed for 525 system.

A38 : DEMO BAL/ETC.VR (625 system)

```
BETACAM DM ADJUST MODE
A38:DEMO BAL/ETC.VR

*DEMO BAL METAL-Y     55
 DEMO BAL METAL-C     55
 DEMO BAL OXIDE-Y     55
 DEMO BAL OXIDE-C     55
 VAR DEEMP-Y          55
 VAR DEEMP-C          55
 SV TAPE SPD OFFSET   55
```

A38 : DEMO BAL VR (525 system)

```
BETACAM DM ADJUST MODE
A38:DEMO BAL VR

*DEMO BAL METAL-C     55
 DEMO BAL OXIDE-C     55
```

“DEMO BAL” adjusts the carrier balance of the demodulator.
“VAR DE EMP” adjusts emphasis during VAR playback.
“SV TAPE SPD OFFSET” adjusts offset of the video level control that changes in accordance with the tape speed during variable speed playback.

A3F : NV-RAM CONTROL

A3F : NV-RAM CONTROL is the menu to save the adjustment data of the Betacam playback system that is adjusted in the “BETACAM DM ADJUST” mode (A3) and “BETACAM TBC ADJUST” mode (A4).
A4F : NV-RAM CONTROL has the same function as that of A3F.

Note

In case that the adjustment data is not saved in this menu and the power is turned off, the adjustment data return to the original value before adjustment.

How to operate

(1) Rotate the JOG dial (or SHUTTLE ring) to move the asterisk (*) mark as follows on the superimposed display.
- When saving the adjustment data upon completion of adjustment :
  ⇨ “SAVE ALL ADJUST DATA”
- “SAVE ADJ” appears on the time data display.

(2) Press the SET button.
- When the SET button is pressed, the data transfer starts.
- “Saving...” appears.

(3) Confirm that the data transfer is complete.
- When the data transfer is complete, “Save Complete” appears on the superimposed display and “COMPLETE” appears on the time data display.

(4) Press the MENU (SHIFT + SET) button to exit the menu.

Example of display and operation

When saving

```
BETACAM DM ADJUST MODE
A3F:NV-RAM CONTROL

*NO OPERATION
 SAVE ALL ADJUST DATA
```

(1) ⇩ JOG dial

```
BETACAM DM ADJUST MODE
A3F:NV-RAM CONTROL

 NO OPERATION
*SAVE ALL ADJUST DATA
```

(2) ⇩ SET

```
BETACAM DM ADJUST MODE
A3F:NV-RAM CONTROL

 Saving ...
```

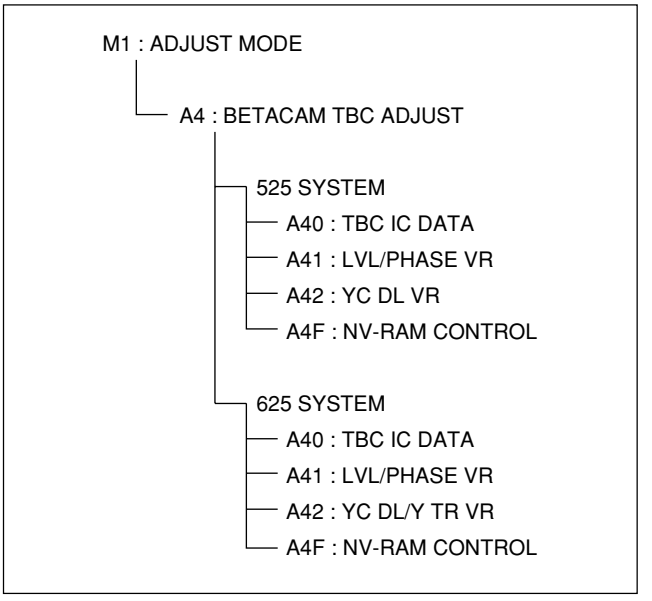
⇩

```
BETACAM DM ADJUST MODE
A3F:NV-RAM CONTROL

 Save Complete
```

(3) ⇩ Check
(4) ⇩ MENU (SHIFT + SET)

3-3-6. BETACAM TBC ADJUST Mode (A4)

A4 : BETACAM TBC ADJUST
This is the menu to adjust the TBC during the Betacam and Betacam SP formats playback.
Contents of this menu are different in 525 system and 625 system.


M1 : ADJUST MODE
A4 : BETACAM TBC ADJUST
525 SYSTEM
A40 : TBC IC DATA
A41 : LVL/PHASE VR
A42 : YC DL VR
A4F : NV-RAM CONTROL
625 SYSTEM
A40 : TBC IC DATA
A41 : LVL/PHASE VR
A42 : YC DL/Y TR VR
A4F : NV-RAM CONTROL

Menu tree of the BETACAM TBC ADJUST mode

Note

If the adjustment data is changed carelessly, it may cause trouble. Follow the adjustment method described in "8-8. Analog Betacam Playback Block Adjustment" to perform the adjustment.
When the adjustment data is changed carelessly, turn off the power without selecting "A4F : NV-RAM CONTROL". Never execute "SAVE ALL ADJUST DATA".

To change the adjustment data by manual operation

(1) On the superimposed display, rotate the JOG dial (or SHUTTLE ring) to select the desired adjustment item with asterisk (*).
On the time data display, rotate the JOG dial (or SHUTTLE ring) to show the desired adjustment item on screen.
(2) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring). Then the adjustment data increases or decreases.

To save the adjustment data

Enter A4F : NV-RAM CONTROL and execute "SAVE ALL ADJUST DATA".

A40 : TBC IC DATA

```
BETACAM TBC ADJUST MODE
A40:TBC IC DATA

*SQ-Y RZ              4B
 SQ-C RZ              6F
```

SQ-Y RZ and SQ-C RZ are to set the read clock timing of the TBC.

A41 : LVL/PHASE VR

```
BETACAM TBC ADJUST MODE
A41:LVL/PHASE VR

*AD LEVEL METAL-Y     7E
 AD LEVEL METAL-C     55
 AD LEVEL OXIDE-Y     07
 AD LEVEL OXIDE-C     55
 VIDEO PH             55
```

AD LEVEL adjusts the input level of the A/D converter of the TBC.
VIDEO PH adjusts the video phase.

A42 : YC DL/Y TR VR (625 system)

```
BETACAM TBC ADJUST MODE
A42:YC DL/Y TR VR

*Y/C DELAY M-A        7E
 Y/C DELAY M-B        55
 Y/C DELAY O-A        55
 Y/C DELAY O-B        55
 Y TR OFFSET          55
```

A42 : YC DL VR (525 system)

```
BETACAM TBC ADJUST MODE
A42:YC DL VR

*Y/C DELAY M-A        7E
 Y/C DELAY M-B        55
 Y/C DELAY O-A        55
 Y/C DELAY O-B        55
```

Y/C DELAY adjusts the Y/C delay.
Y TR OFFSET adjusts the tracking offset that moves the picture to the center of the display during the shuttle operation.

A4F : NV-RAM CONTROL

A4F : NV-RAM CONTROL is the menu to save the adjustment data of the Betacam playback system that is adjusted in the “BETACAM DM ADJUST” mode (A3) and “BETACAM TBC ADJUST” mode (A4).
A3F : NV-RAM has the same function as that of A4F.

Note

In case that the adjustment data is not saved in this menu and the power is turned off, the adjustment data return to the original value before adjustment.

How to operate

(1) Rotate the JOG dial (or SHUTTLE ring) to move the asterisk (*) mark as follows on the superimposed display.
- When saving the adjustment data upon completion of adjustment :
  ⇨ “SAVE ALL ADJUST DATA”
- “SAVE ADJ” appears on the time data display.

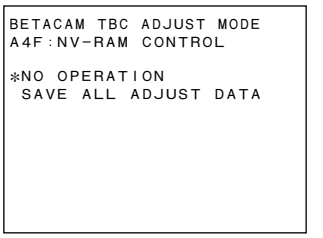
(2) Press the SET button.
- When the SET button is pressed, the data transfer starts.
- “Saving...” appears.

(3) Confirm that the data transfer ends.
- When the data transfer is complete, “Save Complete” appears on the superimposed display and “COMPLETE” appears on the time data display.

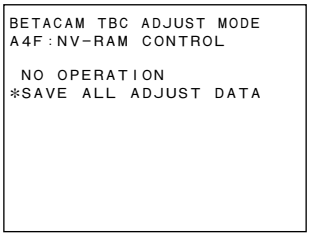
(4) Press the MENU (SHIFT + SET) button to exit the menu.

Example of display and operation

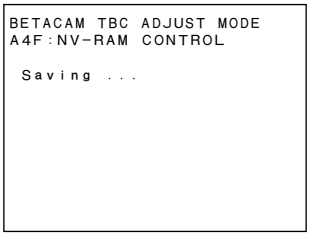
When saving



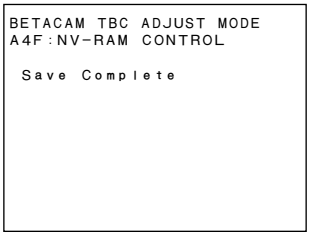
(1) ⇩ JOG dial



(2) ⇩ SET



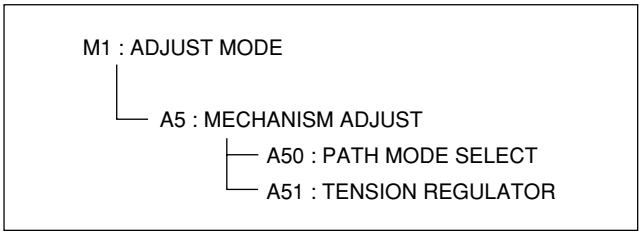
⇩



(3) ⇩ Check
(4) ⇩ MENU (SHIFT + SET)

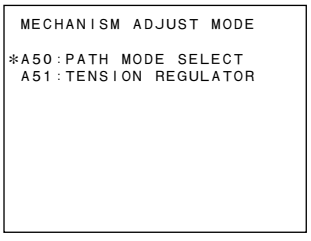
3-3-7. MECHANISM ADJUST Mode (A5)

A5 : MECHANISM ADJUST
This is the mode that is used to adjust the mechanism deck.



Menu tree of the MECHANISM ADJUST mode

A50 : PATH MODE SELECT

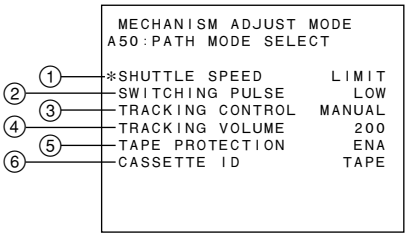


This is the menu to adjust the tape running system.

Note

For the tape running system adjustment, refer to Section 6.

Description of the superimposed display



① Sets the shuttle speed. It is controlled by the SHUTTLE ring.
NORMAL : Normal (7 steps)
LIMIT : ±1, ±2, Shuttle MAX (I)

② Sets the switching pulse.
NORMAL : Performs the RF switching with switching pulse.
LOW : Switching pulse is fixed in the LOW position.

③ Sets the tracking mode.
OFF : Fixed
AUTO : Automatic tracking operation
MANUAL : Variable by manual

④ Displays the amount of tracking when tracking is adjusted manually.
This is only valid when above ③ is set.
While pressing the JOG/SHUTTLE button of the control panel, the amount of tracking can be changed by the JOG dial (or SHUTTLE ring).

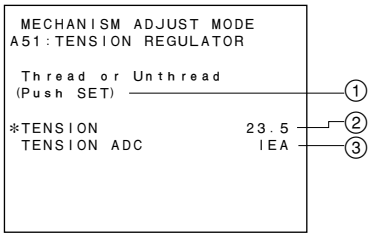
⑤ Sets the tape protection operation.
DIS : Protection operation is not set.
ENA : When error occurs, the protection operation starts.

⑥ Factory use.
Never change the setting.
It may cause that the machine does not work correctly.

To change the setting

(1) On the superimposed display, rotate the JOG dial (or SHUTTLE ring) to select the desired the item with asterisk (*).
On the time data display, rotate the JOG dial (or SHUTTLE ring) to show the desired the item.
(2) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) to show the specified setting.

A51 : TENSION REGULATOR



This is the menu to adjust the tension regulator.

Note

Regarding how to adjust the tension regulator, refer to Section 5-13-2.

Description of the Superimposed Display

① Press the SET button. Then the threading or unthreading operation is performed.

② TENSION : Tension regulator output value (g) after temperature compensation

③ TENSION ADC : A/D converted tension regulator output value (hexadecimal notation) after temperature compensation.

Note

Contents of lines with asterisk (*) on the superimposed display is indicated on the time data display.

3-3-8. Tele-File System Adjustment Mode (A8)

A8 : Tele-File ADJUST
This is the menu in order to supply the power to the Tele-File circuit for the adjustment of the Tele-File.
This menu is displayed in only the models that support the memory label system Tele-File.

To turn on the Tele-File

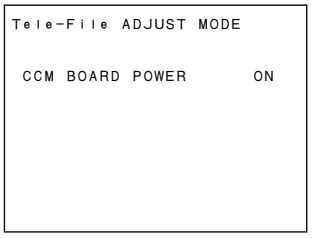
(1) Enter A8 : Tele-File ADJUST.
- The power of the Tele-File circuit is turned on.

Note

When this adjustment is executed in the status that the cassette tape is being inserted, “EJECT...” appears and the cassette tape is ejected.

(2) Perform the Tele-File System Adjustment. (Refer to Section 8-9.)
(3) After completion of the adjustment, press the MENU (SHIFT + SET) button to exit the menu.
- The main power to the Tele-File circuit is turned off (normal operation).

Example of display and operation



(2) ⇩ Tele-File system adjustment
(3) ⇩ MENU (SHIFT + SET)

3-4. Error Logger Display Mode (M2)

This machine has the error log function that saves errors, etc., occurred or detected in this machine.
When the error logger display mode is used, the contents (data) of the error logs are superimposed on the video monitor display.

To Start up and Exit

To start up the error logger display mode, select “M2 : ERROR LOGGER” from the maintenance mode and press the SET button.

To exit this mode, press the MENU (SHIFT + SET) button. When exiting this mode, the machine returns to the operation status before startup of the error logger display mode.

About Error Log

Only tape errors can be saved in the error log.
The individual log consists of error code and time code.
The time code (LTC) data of the VTR side at the time of error occurrence is saved as the time code log data.

The number of the logs to be saved is up to 10. When the number exceeds 10, contents of older error logs are deleted sequentially.

Tape error

When the VTR-related or system-related error (error code from 01 to 99) occurs, the error code is saved. For the error code, refer to Section 2.

How to Operate

Operation procedure of the error logger display mode is described using an example shown on the superimposed display as follows.
The total number of the logs is displayed on the second line. “(01/00)” appears on the superimposed display when no log is saved.
The log is displayed in the area of the 3rd line to the 12th line (total 10 lines). The two digit numbers in the left is the log number and the two digits in the right indicate the log contents.

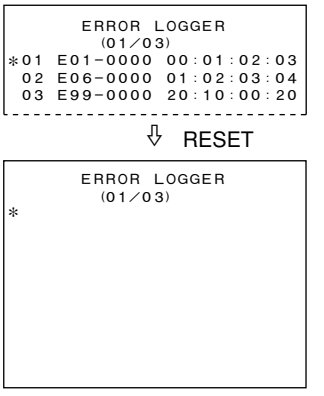
RESET button

When the RESET button is pressed, all the logs that have been saved, are deleted.

Note

Do not delete the logs during the normal operation.
The error logs contain the helpful information to check the operational history of the machine at the time of error occurrence and also the important logs to prevent trouble in advance.

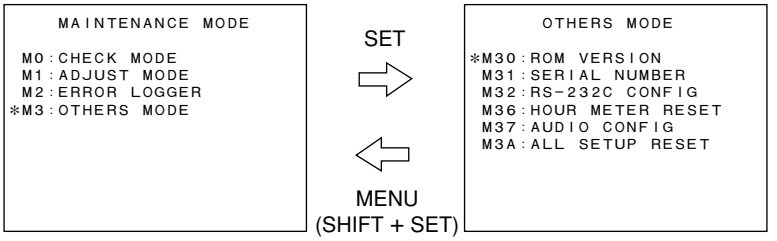
Example of display and operation



3-5. OTHERS Mode (M3)

3-5-1. Overview

The OTHERS mode is the mode to check the other information and to set the other items.

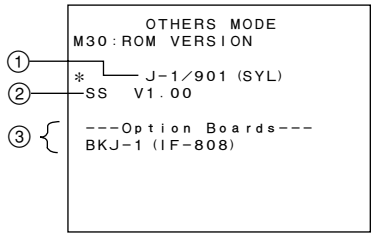


MAINTENANCE mode **OTHERS mode**

Title	Page	Description
M30 : ROM VERSION	3-80	Displays model name of the unit, ROM version, option boards installed.
M31 : SERIAL NUMBER	3-80	Displays and corrects serial number
M32 : RS-232C CONFIG	3-81	Sets the configuration of RS-232C interface.
M36 : HOUR METER RESET	3-81	Displays and resets resettable hours meter and threading counter
M37 : AUDIO CONFIG	3-82	Sets various audio setup.
M370 : METER HEAD ROOM	3-82	Sets head room of audio level meter
M371 : DATA LENGTH	3-82	Selects 16 bits × 8 channels or 20 bits × 4 channels for IMX audio.
M372 : NON-AUDIO PB	3-83	Sets playback channel of non-audio data.
M373 : AUDIO EMPHASIS	3-83	Sets if audio emphasis is added to analog audio signal or not.
M3A : ALL SETUP RESET	3-84	Factory default setup menu

3-5-2. ROM Version Display Menu (M30)

This menu displays model name, destination, ROM version and optional mounted information.



(Ex. : J-1)

Description of the superimposed display

① Displays model name of this unit and destination in parenthesis ( ).

② Version number of SS ROM (System control/Servo control ROM) of this unit is displayed.

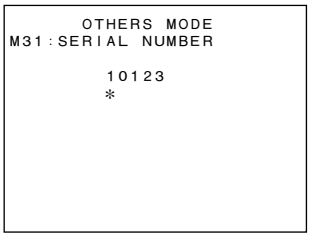
③ When options are installed, information of the options is displayed.

Note

Rotate JOG dial (or SHUTTLE ring) and asterisk (*) moves. Contents of the items with asterisk (*) are shown on the superimposed display.
Mounted options are displayed on the superimposed display only.

3-5-3. Serial Number Display Menu (M31)

This menu displays the serial number of this unit. When the serial number does not match with the unit due to repair, etc., this menu can be used to reset the serial number.



Note

Reset the serial number after replacements of the MB-919 board and NV-RAM (IC1503 on MB-919 board).

Note

When the serial number is not set, “00000” appears.

To set the serial number

(1) Rotate the JOG dial (or SHUTTLE ring) to move the asterisk (*) to the desired digit.
(2) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) and change the numeric value of the digit.
  • When the setting is changed, “Push SET button” appears.
  • Press the MENU (SHIFT + SET) button to stop setting and to exit this menu.
(3) Repeat steps (1) and (2) for each digit.
(4) Press the SET button to save the serial number that has been set.
  • “Saving...” appears. If no abnormality is found, “Save Complete” appears several seconds later.

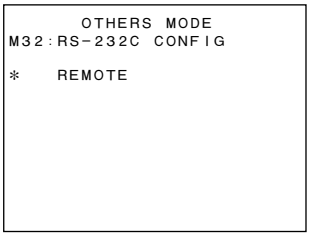
3-5-4. RS-232C Configuration Menu (M32)

This is the menu to set the configuration of an RS-232C interface of this unit.
This menu can be selected from two configurations as follows.

- REMOTE
- TERMINAL

Note

When the main power is ON, RS-232C is set to REMOTE mode.



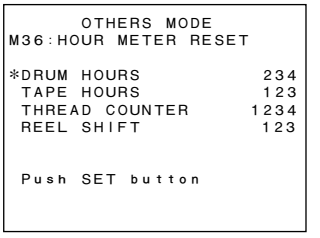
Setting of RS-232C

(1) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) until the desired setting is displayed.
   - When the setting is changed, the message “Push SET button” appears.
   - To stop the setting, press the MENU (SHIFT + SET) button, and exit this menu.

(2) Press the SET button to save the changed setting. (No display of “Complete” is shown this menu.)

3-5-5. Hours Meter Reset Menu (M36)

This menu can display and reset the resettable hours meter and thread counter value.



Description of the superimposed display

DRUM HOURS :	Displays accumulated hours of drum rotation. Same as the setup menu ITEM-H12
TAPE HOURS :	Displays accumulated hours of tape run. Same as the setup menu ITEM-H13
THREAD COUNTER :	Displays accumulated times of threading. Same as the setup menu ITEM-H14
REEL SHIFT :	Displays accumulated times of the reel shift. Same as the setup menu ITEM-H16

To reset

Note

If the hours meter data is reset by pressing the SET button, the reset data cannot be returned to the original data any more.

(1) Rotate the JOG dial (or SHUTTLE ring) to select the desired reset item with asterisk (*).

   Note

   Contents of lines with asterisk (*) on the superimposed display, are shown on the time data display.

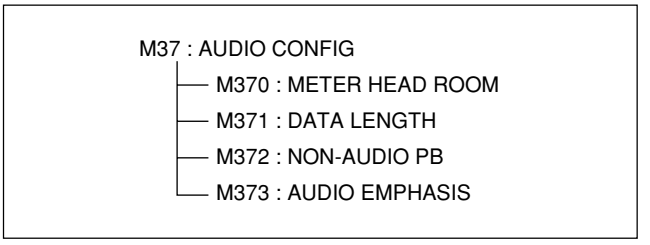
(2) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) counterclockwise (↺), and set the display value to “0”.
   - When setting the display value to “0”, “Push SET button” appears on the superimposed display only.
   - If you want to return the value to the original data, rotate the JOG dial (or SHUTTLE ring) clockwise (↻).

(3) If you have other items to reset, repeat steps (1) and (2).

(4) Press the SET button to save the reset data.
   - “Saving...” appears. If no abnormality is found, the display changes to “Save Complete” several seconds later. To delete “Save Complete”, rotate the JOG dial (or SHUTTLE ring).

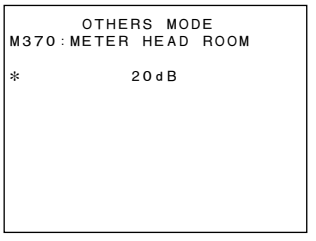
3-5-6. Audio Configuration Menu (M37)

This menu is to perform various setting for audio items. It contains the following submenus.



Menu tree of the AUDIO CONFIG menu

M370 : METER HEAD ROOM



This submenu set the head room of the audio level meter. The head room can be selected from three levels as follows:
20 dB, 18 dB , and 16 dB
(Factory default is 20 dB.)

To set the head room

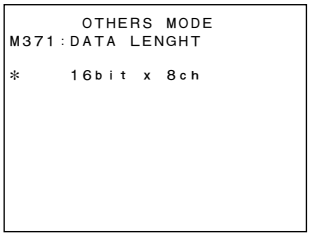
(1) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) until the desired setting is displayed.
- When the setting is changed, “Push SET button” appears.
- To stop the setting, press the MENU (SHIFT + SET) button, and exit this menu.

(2) Press the SET button to save the changed setting.
- “Saving...” appears. If no abnormality is found, the display changes to “Save Complete” several seconds later.
  To delete “Save Complete”, rotate the JOG dial (or SHUTTLE ring).

Note

Perform the monitor output level setting with the head room setthing. For details, refer to Section 1-12-2.

M371 : DATA LENGTH



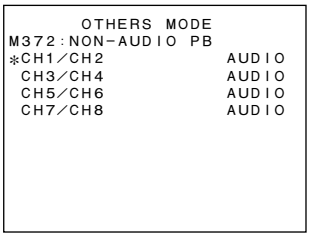
This is the submenu that is used to set the digital audio channel configuration during playback and can be selected from two configurations as follows.
16 bits × 8 ch. or 20 bits × 4 ch.
(Factory default is 16 bits × 8 ch.)

To set “DATA LENGTH”

(1) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) until the desired setting is displayed.
- When the setting is changed, “Push SET button” appears.
- To stop the setting, press the MENU (SHIFT + SET) button, and exit this menu.

(2) Press the SET button to save the changed setting.
- “Saving...” appears. If no abnormality is found, the display changes to “Save Complete” several seconds later.
  To delete “Save Complete”, rotate the JOG dial (or SHUTTLE ring).

M372 : NON-AUDIO PB



This is the submenu that is used to set the channel that performs the non-audio data playback.
Either AUDIO or DATA can be selected for CH1/2, CH3/4, CH5/6, and CH7/8.
(Factory default is AUDIO for all channels.)

To set the non-audio playback

(1) Rotate the JOG dial (or SHUTTLE ring) to select the channel pair with asterisk (*).

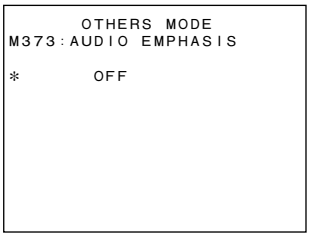
Note

Contact of lines with asterisk (*) on the super imposed display is indicated on the time data display.

(2) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) until the desired setting is displayed.
- When the setting is changed, “Push SET button” appears.
- To stop the setting, press the MENU (SHIFT + SET) button, and exit this menu.

(3) Press the SET button to save the changed setting.
- “Saving...” appears. If no abnormality is found, the display changes to “Save Complete” several seconds later.
  To delete “Save Complete”, rotate the JOG dial (or SHUTTLE ring).

M373 : AUDIO EMPHASIS



This is the submenu that is to used to set emphasis on the analog audio signal or not. “OFF” or “ON” of audio emphasis can be selected. (Factory default is “OFF”.)

To set the audio emphasis

(1) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) until the desired setting is displayed.
- When the setting is changed, “Push SET button” appears.
- To stop the setting, press the MENU (SHIFT + SET) button, and exit this menu.

(2) Press the SET button to save the changed setting.
- “Saving...” appears. If no abnormality is found, the display changes to “Save Complete” several seconds later.
  To delete “Save Complete”, rotate the JOG dial (or SHUTTLE ring).

3-5-7. Setup Items Reset Menu (M3A)

This menu is used to reset all of the setups as listed below to the factory default setups simultaneously at one time.

- All of the current setups, bank 1 setups, and bank 2 setups in the setup menu.
- ITEM-013 : 525/625 SYSTEM SELECT in the setup menu
- Error log

To execute

(1) While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) until the display is changed from “OFF” to “ON”.
  - “All the System Setup data will be changed to Factory default” appears on the superimposed display.

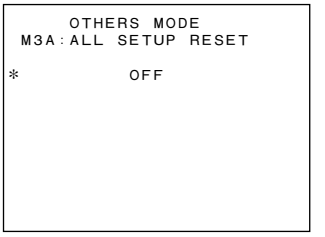
(2) Press the SET button.
  - During change of setups, “Executing...” appears on the superimposed display.

(3) Confirm that the setup change is complete.
  - When the setup change is complete, “Complete” and “Turn off/on POWER!!” appears on the superimposed display.

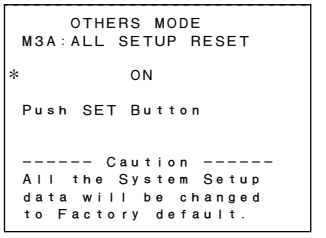
(4) Turn the power OFF.

(5) Turn the power ON again.

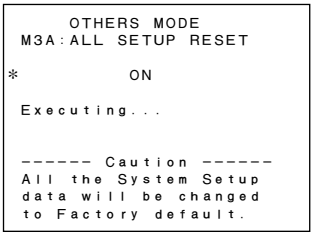
Example of display and operation



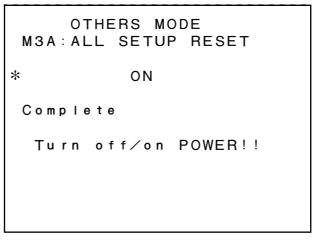
(1) ⇩ JOG/SHUTTLE + Dial



(2) ⇩ SET



(3) ⇩ Check



(4) ⇩ Turn the POWER OFF

(5) ⇩ Turn the POWER ON

Section 4
Periodic Inspection and Maintenance

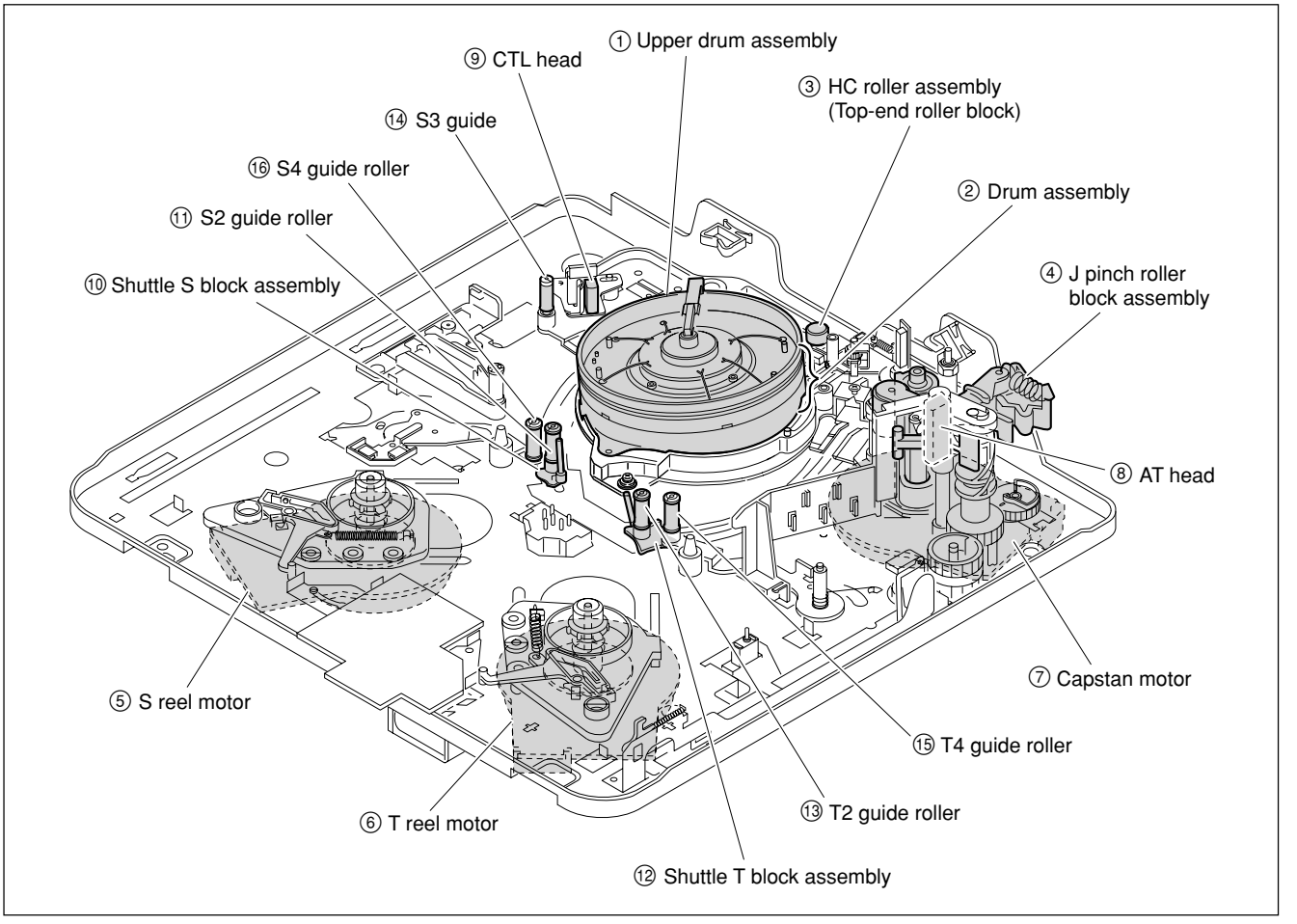
This section describes the periodic inspection and cleaning methods.

4-1. Periodic Inspection

Periodic inspection of the major blocks and periodic replacement of parts are important to ensure that the unit continues to perform as specified for a long time.

4-1-1. Index

The parts shown in the following illustration require periodic inspection/maintenance.
The numbers given by each part correspond to the periodic inspection and replacement table on the next page.


① Upper drum assembly
⑨ CTL head
③ HC roller assembly (Top-end roller block)
⑭ S3 guide
⑯ S4 guide roller
② Drum assembly
⑪ S2 guide roller
④ J pinch roller block assembly
⑩ Shuttle S block assembly
⑧ AT head
⑦ Capstan motor
⑤ S reel motor
⑮ T4 guide roller
⑬ T2 guide roller
⑥ T reel motor
⑫ Shuttle T block assembly

4-1-2. Periodic Inspection and Replacement Table

The following table does not show the guaranteed time of each part.
The timing of parts replacement depends on the operating environment and conditions. The pinch roller and the cleaner especially may require more frequent replacement than that shown in the table depending on the degree of wear and contamination.
For details of the hours meter, refer to Section 4-1-3.
For the parts replacement procedure, refer to Section 5.

Meanings of symbols and conventions in the table
R : Replacing the part
C : Perform check (or adjustment). In case of abnormality/specification is not satisfied, replace the part.
⇧ (or ⇩) : Indicates that the part must be replaced together with the part shown in the lower (or upper) column when replaced.

No.	Replacement parts	Hours meter (Menu No.)	Inspection hours (1000 h)/ Replacement period 1	2	3	4	5	6	Reference	Part No. /Part Name	Q'ty
①	Upper drum assembly	Drum rotating time (H02)	– *1	–	C	C	C	C⇩	Check : Sec. 4-3 (Replace : Sec. 5-2)	J-1 : A-8327-511-A DJR-30A-R J-2 : A-8329-126-A DJR-31A-R J-3 : A-8329-126-A DJR-31A-R	1
②	Drum assembly *2	Drum rotating time (H02)	– *1	–	–	–	–	C	Check : Sec. 6-3 (Replace : Sec. 5-3)	J-1 : A-8327-510-A DJH-30A-R J-2 : A-8329-125-A DJH-31A-R J-3 : A-8329-125-A DJH-31A-R	1
③	HC roller assembly (Top-end roller block)	Drum rotating time (H02)	–	–	R	–	–	R	Sec. 5-4	X-3605-665-2 ROLLER ASSY, HC	1
			Replace every 3000 h								
④	J pinch roller block assembly	Drum rotating time (H02)	–	–	R	–	–	R	Sec. 5-7	A-8279-550-A BLOCK ASSY, ROLLER, PINCH, J	1
			Replace every 3000 h								
⑤ ⑥	S reel motor T reel motor	Drum rotating time (H02)	–	–	–	–	–	R	Sec. 5-11	8-835-501-01 MOTOR, DC	2
			Replace every 6000 h								
⑦	Capstan motor	Drum rotating time (H02)	–	–	–	–	–	R	Sec. 5-8	8-835-480-02 MOTOR, DC (SCV-0401A)	1
			Replace every 6000 h								
⑧	AT head	Drum rotating time (H02)	–	–	C	–	–	C	Sec. 5-6	8-825-778-91 HEAD (PS244-2103G)	1
⑨	CTL head	Drum rotating time (H02)	–	–	C	–	–	C	Sec. 5-5	1-500-688-11 HEAD, AC (TDK)	1
⑩	Shuttle S block assembly	Drum rotating time (H02)	–	–	C	–	–	C	Sec. 5-15	A-8279-558-D SHUTTLE (S) ASSY	1
⑪	S2 guide roller	Drum rotating time (H02)	–	–	C	–	–	R⇧	Sec. 5-15	X-3608-259-2 ROLLER ASSY, GUIDE	1
			Replace every 6000 h								

*1 : After elapse of 6000 h, perform the check every 1000 h.
*2 : The drum assembly contains the upper drum assembly.

(Continue)

No.	Replacement parts	Hours meter (Menu No.)	Inspection hours (1000 h)/ Replacement period 1	2	3	4	5	6	Reference	Part No. /Part Name	Q'ty
⑫	Shuttle T block assembly	Drum rotating time (H02)	–	–	C	–	–	C	Sec. 5-16	A-8279-559-D SHUTTLE (T) ASSY	1
⑬	T2 guide roller	Drum rotating time (H02)	–	–	C	–	–	R⇧ Replace every 6000 h	Sec. 5-16	X-3608-259-2 ROLLER ASSY, GUIDE	1
⑭	S3 guide	Drum rotating time (H02)	–	–	C	–	–	R Replace every 6000 h	Sec. 5-18	X-3608-388-1 G3 GUIDE ASSY	1
⑮	T4 guide roller	Drum rotating time (H02)	–	–	C	–	–	R Replace every 6000 h	Sec. 5-19	A-8279-560-E ASSY, T4	1
⑯	S4 guide roller	Drum rotating time (H02)	–	–	C	–	–	R Replace every 6000 h	Sec. 5-13	A-8279-547-D ARM ASSY, S-TEN	1

If the unit is used such that threading and unthreading are performed frequently, periodic replacement of the parts shown in the following table is recommended.

Replacement parts	Hours meter (Menu No.)	Replacement period	Reference	Part No. /Part Name	Q'ty
Cassette compartment assembly	Threading time (H04)	50,000 times	Sec. 1-5	A-8328-646-B CASSETTE COMPARTMENT ASSY (RP)	1
Threading motor	Threading time (H04)	200,000 times	Sec. 5-20	A-8328-067-A MOTOR SUB ASSY, THREADING	1
Plunger solenoid (for releasing brake)	Threading time (H04)	100,000 times	Sec. 5-21	1-454-487-31 SOLENOID, PLUNGER	1
Brake lever assembly (for reel brake)	Threading time (H04)	100,000 times	Sec. 5-10	X-3608-272-1 LEVER ASSY, BRAKE	1

4-1-3. Hours Meter

The hours meter data can be shown in the time data display area on the control panel of this unit.
Use the hours meter data as a guideline for periodic inspection and replacement.

1. Display contents

Menu No.	Menu indication	Item	Contents
H01	OPE HOURS	OPERATION HOURS	Accumulated power-on hours
H02	DRUM HOURS	DRUM RUNNING HOURS	Accumulated drum revolution hours
H03	TAPE HOURS	TAPE RUNNING HOURS	Accumulated tape running hours
H04	THRED COUNT	THREADING COUNTER	Accumulated times of threading
H06	REEL SHIFT	REEL SHIFT COUNTER	Accumulated times of reel shift
H12	DRUM HOURS r	DRUM RUNNING HOURS	Accumulated drum revolution hours (resettable)
H13	TAPE HOURS r	TAPE RUNNING HOURS	Accumulated tape running hours (resettable)
H14	THRED COUNTr	THREADING COUNTER	Accumulated times of threading (resettable)
H16	REEL SHIFT r	REEL SHIFT COUNTER	Accumulated times of reel shift (resettable)

2. Display method

1. While pressing the SHIFT button on the control panel, press the SET button to show the SETUP MENU on the time data display area.
2. Rotate the JOG dial to show the desired ITEM on the time data display area.

   Note

   To check the hours meter value on the video monitor, rotate the JOG dial (asterisk ✻ mark) to move the cursor to the desired ITEM.

3. Pressing the JOG/SHUTTLE button shows the hours meter value on the time data display area or on the video monitor display.
4. Press the SET button to exit the setup menu.

4-2. Cleaning

Cleaning is an important part of daily maintenance are important to ensure that the unit and tape continue to perform as specified for a long time.

4-2-1. Cleaning Method using Cleaning Tape

When the video head is clogged, clean it as follows using the specified cleaning tape. Be sure to use the specified cleaning tape. If any other cleaning tape is used, abnormal abrasion or damage of the video head may occur.

Specified cleaning tape : BCT-HD12CL

Cleaning procedure

1. Insert the cleaning tape BCT-HD12CL in to the unit.
   When the cassette is inserted, the cleaning tape is played back automatically for about 5 seconds, then the cleaning tape is ejected automatically.
   Notes
   - If the cleaning tape is not ejected automatically even after it is played back for 5 seconds or longer, push the EJECT button immediately to eject it.
   - Never leave the cleaning tape in the unit or run it in fast-forward or rewind as doing so may severely damage the video head.

2. Check that the head is no longer clogged.

If the head is still clogged after using the cleaning tape, clean the video head with the cleaning cloth. (Refer to Section 4-2-3.)

4-2-2. General Information for Cleaning with Cleaning Cloth

1. Precautions

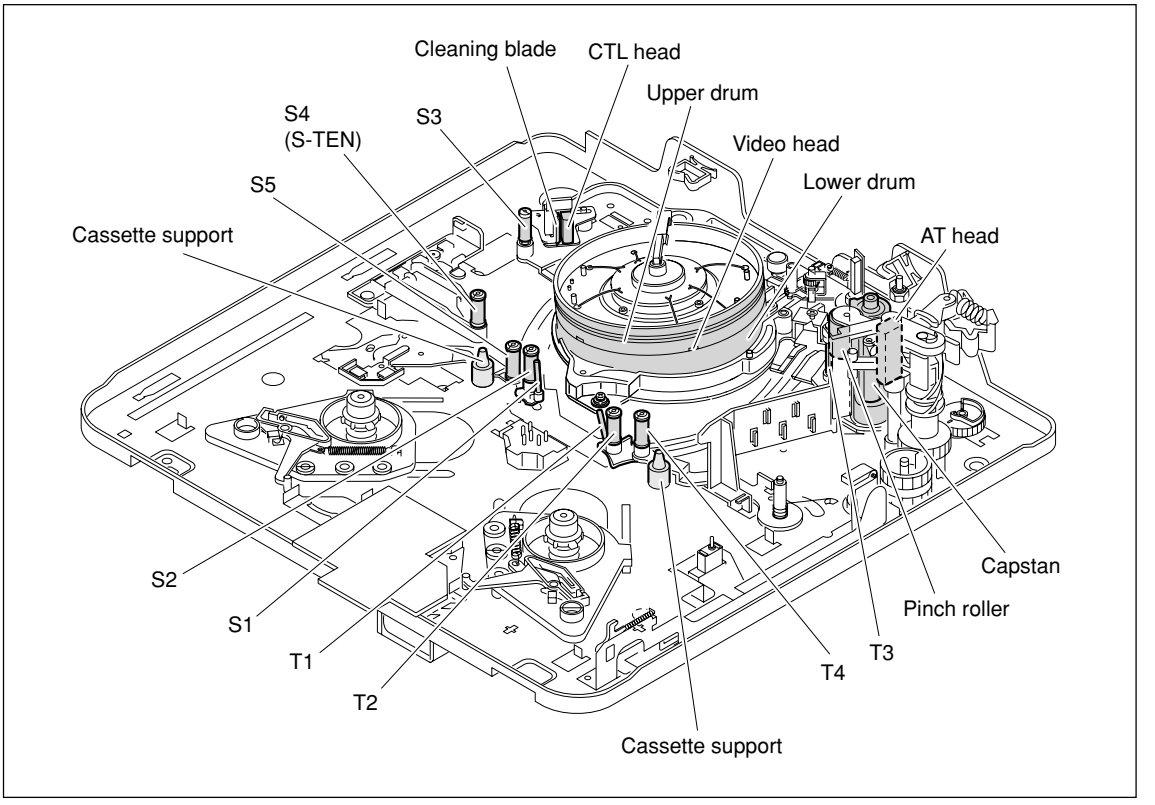
- Be sure to turn off the main power before cleaning.
- The respective blocks in the mechanism deck contain precision parts and are precisely adjusted. Implement cleaning with care to avoid damaging any parts and do not apply more force than required.
- Be careful not to touch the grease-coated parts while cleaning. If grease adheres to the cleaning cloth, exchange the cloth.
  If a cleaning cloth contaminated with grease is used, grease may stick to unwanted parts.
- After cleaning, insert a cassette tape after the cleaning fluid has completed dried.

2. Preparation before cleaning

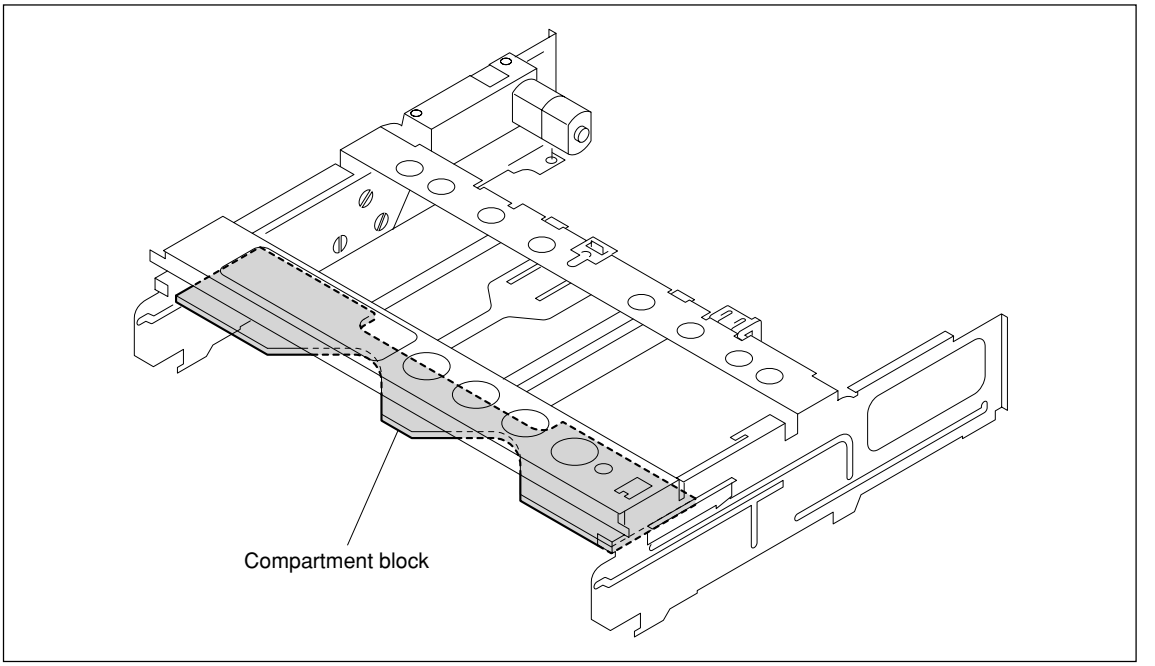
1. Turn off the main power.
2. Remove the top panel assemblyz. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)

3. Cleaning Points

Mechanism Deck Block



Cassette Compartment



4-2-3. Cleaning of Upper Drum Tape Running Surface and Video Head

CAUTION

Never touch the rotating drum. If hand or fixture touches the drum rotating at a high speed with, it will be flipped by the rotating drum and may receive physical injury.
Start cleaning after turning off the main power and the drum comes to a complete stop.

Note

The video heads can be very easily scarred. Be very careful not to damage the video heads during cleaning.

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Note

Never use a cotton swab for cleaning the video heads.

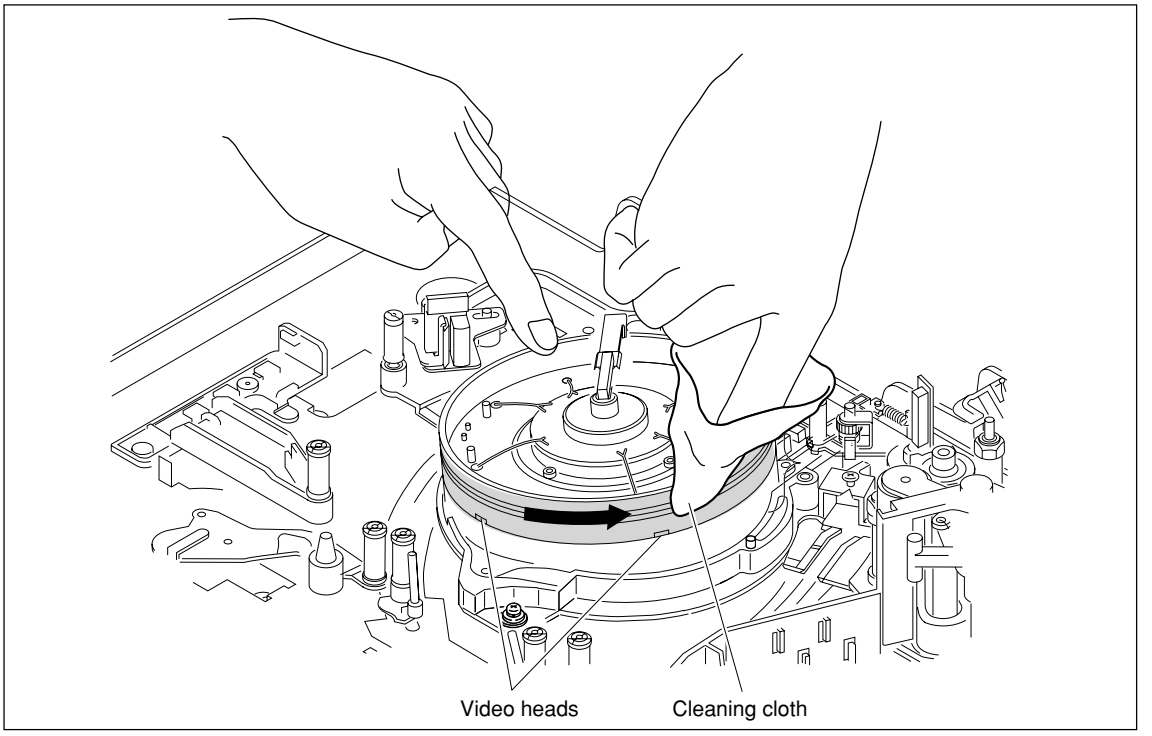
Procedure

1. Hold the cleaning cloth moistened with cleaning fluid by hand in a manner that the cleaning cloth does not get wrinkled. Gently press the cleaning cloth against the video heads.
2. Fix the cleaning cloth and slowly rotate the upper drum counter-clockwise two or three turns to clean the video heads and the upper drum tape running surface (shaded ▭ area shown in illustration).

   Note

   Be sure to rotate the upper drum counter-clockwise and clean the video heads along with the circumference.
   If the upper drum is rotated in the opposite direction (clockwise direction), or if the video heads are cleaned in the vertical direction, the video heads will be damaged.

3. After cleaning with the cleaning fluid, wipe the cleaned areas two or three times using a dry cleaning cloth.



4-2-4. Cleaning of Lower Drum Tape Running Surface and Drum Lead (Rabbet Guide)

Note

Be careful not to scar the lower drum (especially lead area: rabbet guide area).
Be very careful when cleaning the top edge of the lower drum not to damage the video heads because the top edge of the lower drum is very close to the video heads.

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Skewer of a equivalent (Never use a metallic stick.)

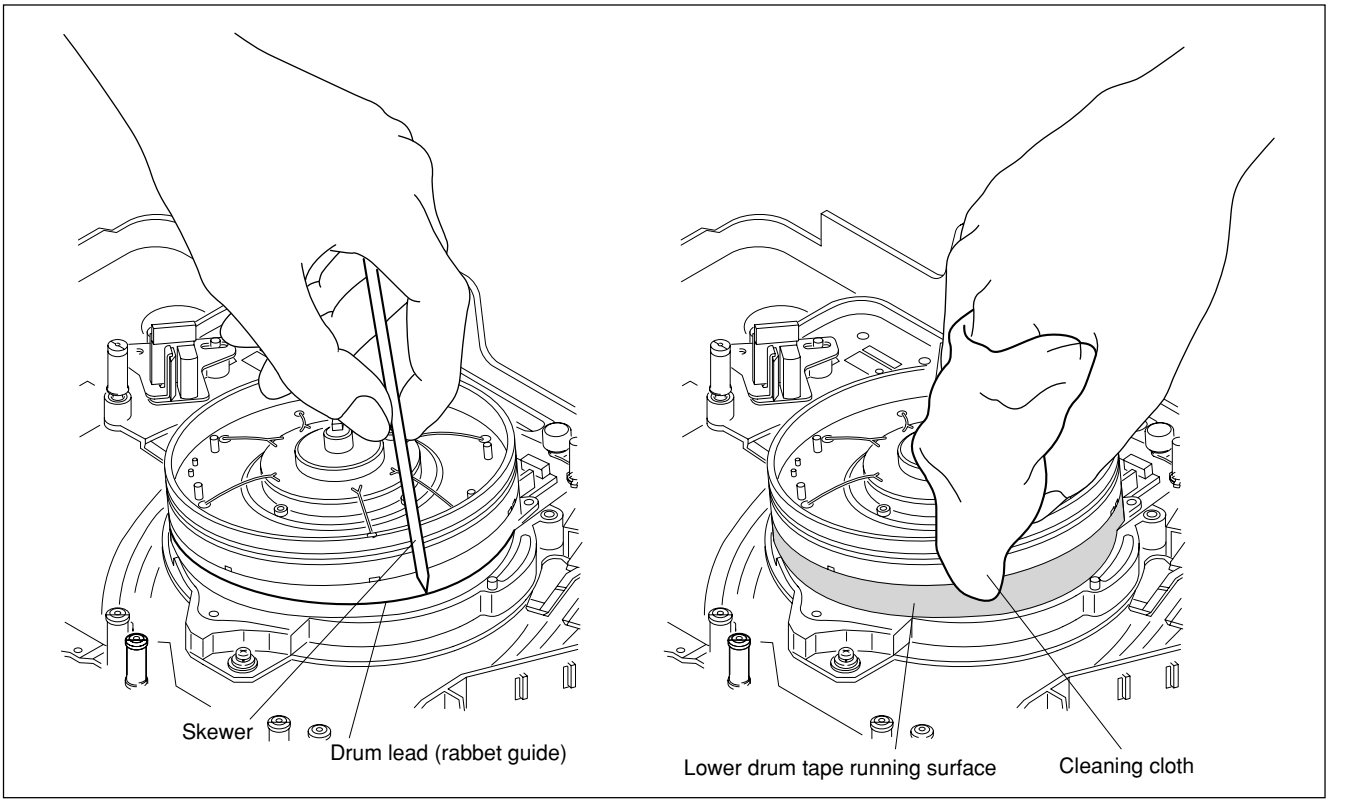
Procedure

1. Remove the magnetic powder from the drum lead (rabbet guide) by running the skewer (or equivalent) along with the drum lead (rabbet guide).

   Notes

   - Never use a metallic stick instead of a skewer not to scar nor damage the tape running surface.
   - If magnetic powder remains in the drum lead (rabbet guide), the tracking may be adversely affected by the residues. Be sure to remove the residues completely.

2. Clean the drum lead (rabbet guide) and the lower drum tape running surface (shaded ▭ area shown in illustration) with cleaning cloth moistened with cleaning fluid.
3. After cleaning with the cleaning fluid, wipe the cleaned areas two or three times using a dry cleaning cloth.



4-2-5. Cleaning of Stationary Heads and Cleaning Blade

CAUTION

The cleaning blade edge is very sharp that you can easily cut your hand. Never touch the blade with bare hands. Be very careful during cleaning.

Note

Be careful not to scar the surface of the stationary heads when cleaning them.

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Procedure

1. Scrape the magnetic powder off the cleaning blade by rubbing the surface of the cleaning blade from top to bottom with a normal photo-copying paper.

   Notes

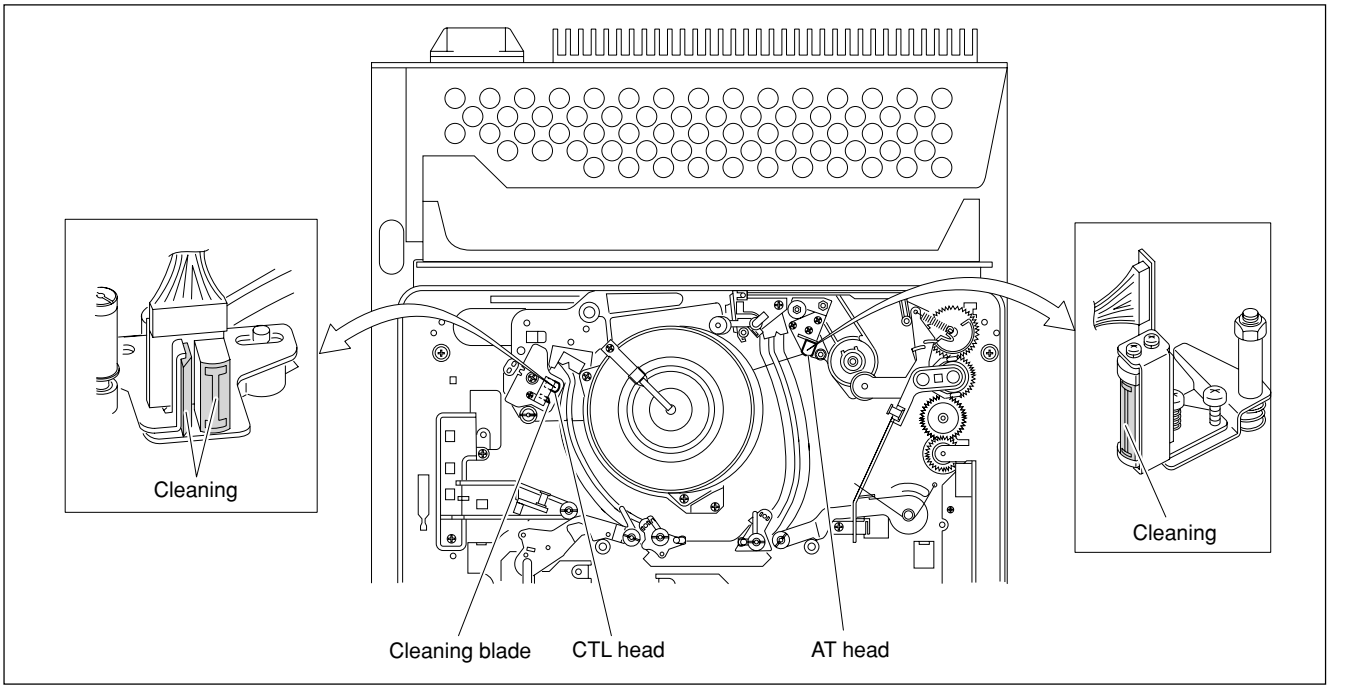
   - Never touch the cleaning blade edge with bare hand.
   - Do not exert an excessive force that scar the cleaning blade.

2. Clean the tape running surface (shaded ▭ area shown in illustration) of the AT head, CTL head and the cleaning blade with the cleaning cloth moistened with cleaning fluid.

   Note

   If magnetic powder remains in the gap of the AT head and the CTL head, the playback error may occur. Be sure to remove the magnetic powder completely.

3. After cleaning with the cleaning fluid, wipe the cleaned areas two or three times using a dry cleaning cloth.



4-2-6. Cleaning of Tape Running Path Cleaning Blade

CAUTION

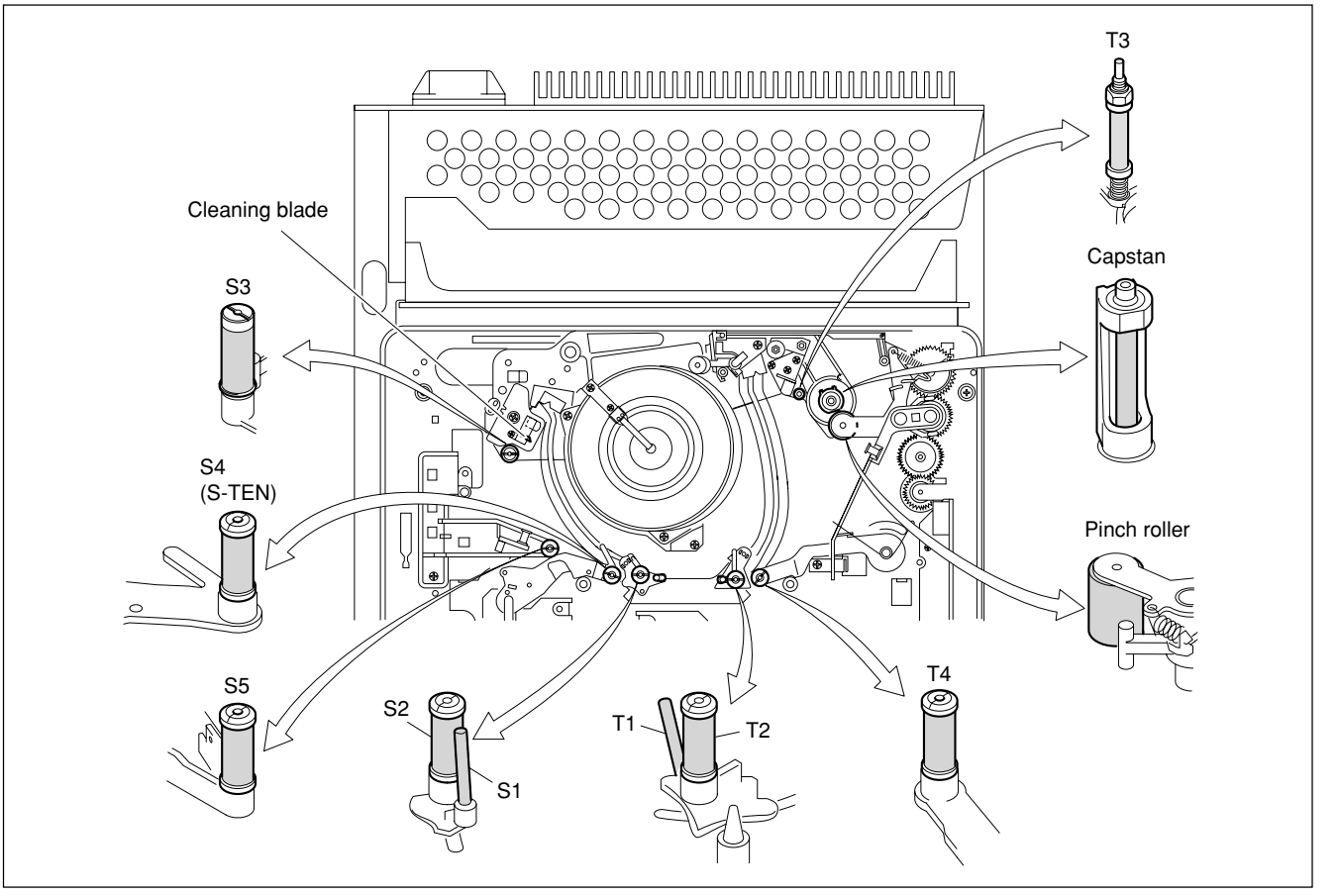
The cleaning blade edge is very sharp that you can easily cut your hand. Never touch the blade with bare hands. Be very careful not to cut your hand with the blade during cleaning.

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Procedure

1. Clean the tape running surface (shaded ▭ area shown in illustration) of the respective heads with the cleaning cloth moistened with cleaning fluid.
2. After cleaning with the cleaning fluid, wipe the cleaned areas two or three times using a dry cleaning cloth.



4-2-7. Cleaning of Cassette Compartment and Cassette Support

Notes

- Do not apply more force than required during cleaning.
- Never use chemicals such as alcohol for cleaning the cassette door, as the chemicals may cause cracks in the cassette door.

Tools

- Cloth (or gauge)
- Vacuum cleaner

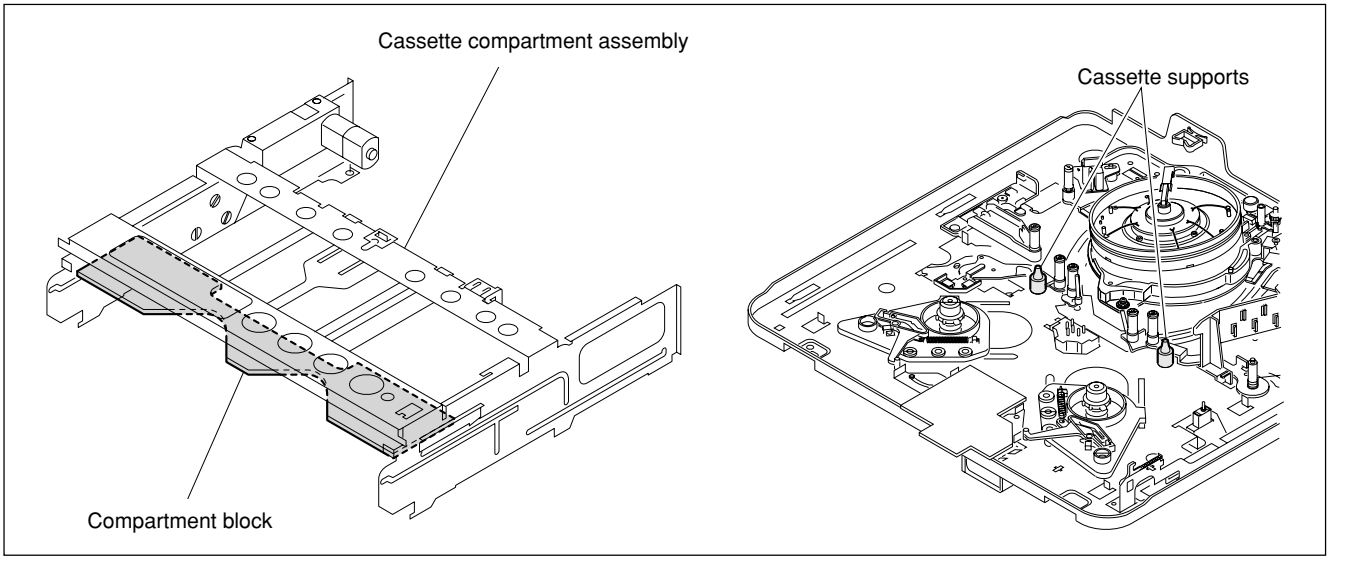
Procedure

1. Remove dust on the compartment block from the cassette insertion inlet side using a vacuum cleaner.
2. Wipe the compartment block (shaded ▭ area in the illustration) with a dry cloth (or gauze).

   Note

   Do not apply more force than required to the compartment block.

3. Clean the two cassette supports on the mechanism deck with a dry cleaning cloth.



4-3. Video Head Tip Protrusion Check

Measure the amount of video head tip protrusion using the head tip protrusion measurement gauge during periodic maintenance to check if the upper drum assembly needs to be replaced.

When all of the heads protrude more than the specified values shown in the following table, the signals recorded on tape can be played back.

Head	Specifications
Y-A, Y-B, C-A, C-B	20 µm
A, B*, C, D*	22 µm

* : J-2/J-3 only.

If any of the heads does not satisfy the tip protrusion specifications, the upper drum assembly must be replaced earlier (before actual failure occurs).
Refer to Section 5-2 for the upper drum replacement procedure.

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-537-01
- Head tip protrusion measurement gauge : J-6530-650-A

4-3-1. Head Tip Protrusion Measurement

Preparation of VTR

1. Remove the top panel assembly.
   (Refer to Section 1-4-1.)
2. Remove the cassette compartment assembly.
   (Refer to Section 1-5.)
3. Clean the tape running surface, top surface of the outer circumference and video heads of the upper drum (shaded area in Figure 1) with a cleaning cloth.
   (Refer to Section 4-2-3 for the cleaning procedure.)

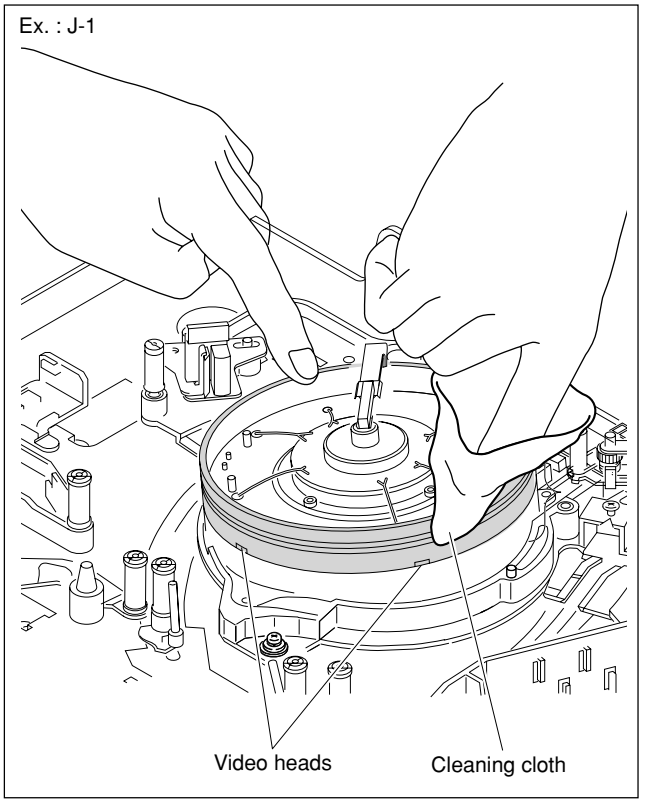


Figure 1. Cleaning the upper drum

Preparation of Head Tip Protrusion Measurement Gauge

The head tip protrusion measurement gauge is a precision fixture which must be handled with care.

1. Loosen the adjustment screw fully (by turning it counter-clockwise).
2. Clean all points that touch the drum : the probe, positioning flange, and two feet. (See Figure. 2.)

   Note

   Do not apply excessive force to the probe, and clean it carefully.

   If foreign materials of micron order (μm) have accumulated, accurate measurement cannot be performed.

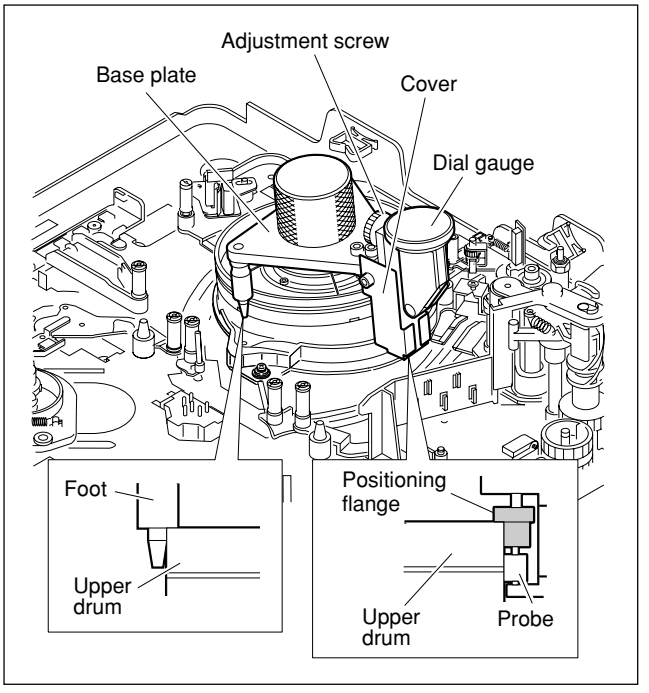


Figure 2. Head tip protrusion measurement gauge (after if is attached)

Setting the Head Tip Protrusion Measurement Gauge

Note

Set the head tip protrusion measurement gauge very carefully to avoid giving shock to the tape running surface of the drum and to the video head.

1. Turn the upper drum counter-clowckwise to align the phase hole in line with the axis ground assembly as shown.

   Note

   The above upper drum position ensures that the probe of the head tip protrusion measurement gauge contacts the area where there are no heads.

   The tip protrusion is to be measured for the Y-A head.

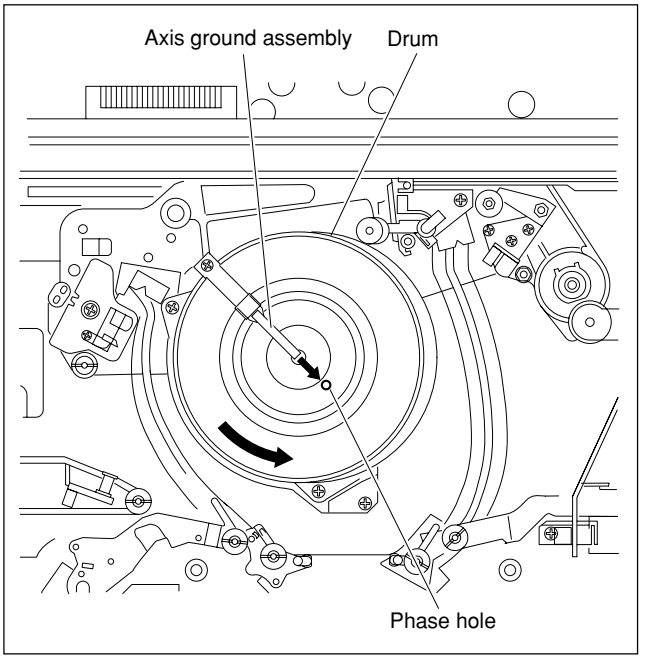


Figure 3. Determining the upper drum position

2. Read the value of the dial gauge pointer. (This is the pointer value before setting the measurement gauge to the upper drum.)

   Note

   Before setting the measurement gauge to the upper drum, confirm that the adjustment screw is fully loosened.

3. Check that the probe is sufficiently apart from the drum. Press the tips of the two feet of the measurement gauge against the outer circumference of the upper part of the upper drum while keeping the base plate of the measurement gauge and the upper part of the drum parallel to each other.
4. While pressing the tips of the two feet of the measurement gauge against the outer circumference of the upper part of the upper drum (and while applying force to the measurement gauge in the direction of arrow "A"), gently lower the measurement gauge until the two feet contact the ridges of the positioning flange. (See Fig. 4.)
5. Move the fixture in the direction of arrow "B" until there is no mechanical play and the feet of the fixture gently contact the axial bracket.

   Notes

   - Set the measurement gauge slowly and carefully so that the probe of the measurement gauge does not contact the drum or video head.
     (It is recommended to lower the measurement gauge so that the probe is positioned a little higher than the two legs.)
   - Keep holding the measurement gauge by hand after it is set on the drum. If you remove your hand, the upper drum may rotate with the measurement gauge set and damage the periphery of the drum.

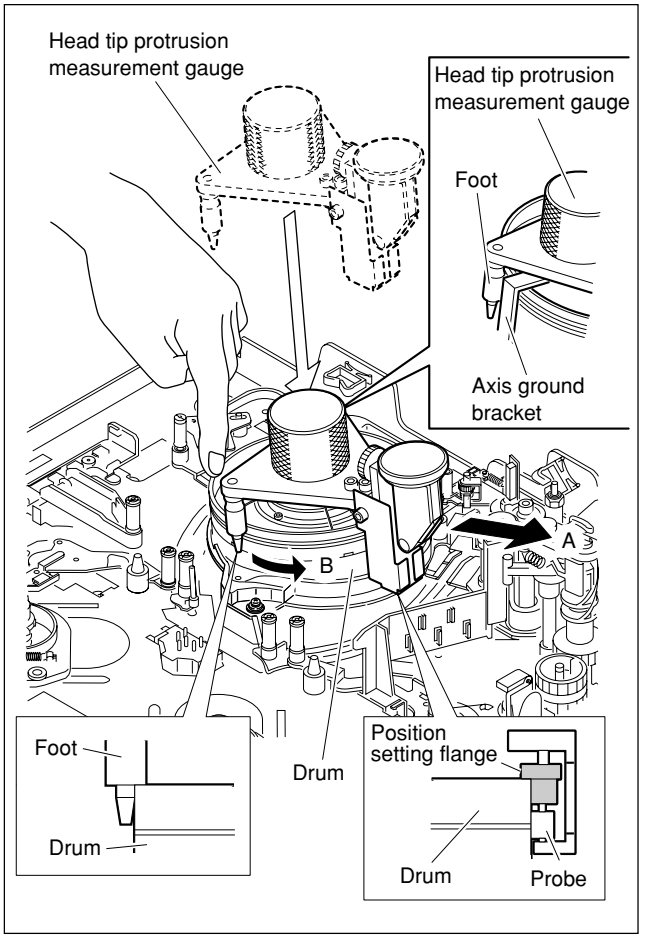


Figure 4. Setting the head tip protrusion measurement gauge

6. Check to see the following:
   - The probe is positioned in the center between neighboring heads.
   - The positioning flange is closely in contact with the outer circumference of the upper part of the drum.
   - The feet are closely in contact with the outer circumference of the upper part of the upper drum.
   - The pointer value of the dial gauge remains unchanged from the value measured before setting the measurement gauge (in step 2).

7. Turn the adjustment screw clockwise until the dial gauge pointer rotates about a half turn.
8. Turn the outer frame of the dial gauge to align zero (0) to the pointer.

Measurement of Head Tip Protrusion

Note

When turning the upper drum, hold the cover of the measurement gauge by hand so that the measurement gauge does not rotate together with the upper drum. Also, rotate the upper drum only in the counter-clockwise direction (↺).

1. Turn the upper drum counter-clockwise (↺) very slowly and gently to approach video head immediately before the probe.
   (Refer to <A> of Figure 5.)
2. Read the dial gauge pointer value. (= Ha)
   Note
   One scale of the dial gauge is 2 µm (0.002 mm).
   A positive (+) value is indicated when the pointer turns clockwise, and a negative (−) value when the pointer turns counter-clockwise.
3. Turn the upper drum counter-clockwise (↺) very slowly and gently to center the video head on the probe. (Refer to <B> of Figure 5.)
4. Read the dial gauge pointer value. (= Hb)
5. Calculate the actual amount of head tip protrusion (Hr) from the Ha and Hb measurements as follows:
   Hr = Hb − Ha
6. Repeat the above steps 1 to 5 for all heads and calculate the head tip protrusion (Hr) of all heads.
7. Perform the head tip protrusion measurement for all heads again.
   Note
   Measure the head tip protrusion (Hr) twice for all heads in order to eliminate measurement errors.

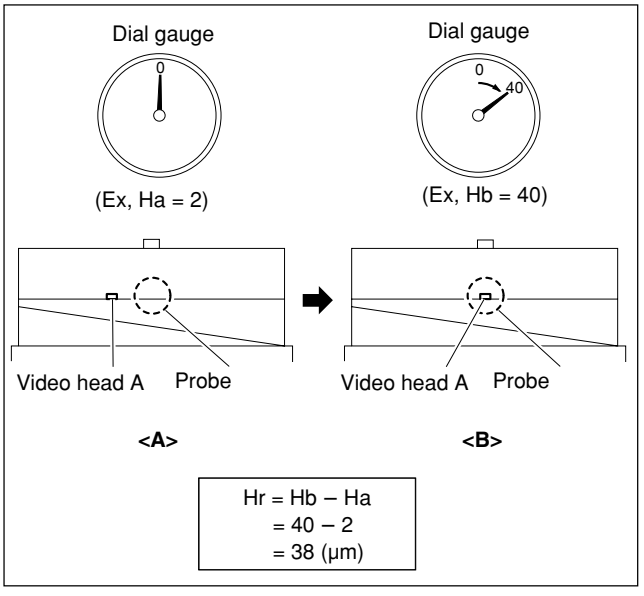


Figure 5. Example of head tip protrusion measurement

Create the following table in order during head tip measurement.

Head	Specifications (µm)	Amount of head tip protrusion (Hr = Hb − Ha)					
		1st measurement			2nd measurement		
Y-A	20≦	=	−	|	=	−	
C-A	20≦	=	−	|	=	−	
PB C	22≦	=	−	|	=	−	
PB D*	22≦	=	−	|	=	−	
Dummy	Measurement is not required						
Y-B	20≦	=	−	|	=	−	
C-B	20≦	=	−	|	=	−	
PB A	22≦	=	−	|	=	−	
PB B*	22≦	=	−	|	=	−	

* : J-2/J-3 only

Removing the Head Tip Protrusion Measurement Gauge

1. Turn the upper drum counter-clockwise (↺) very slowly and gently to move the video head away from the probe.
2. Loosen the adjustment screw fully.
3. Raise the positioning flange of the measurement gauge away from the outer circumference of the upper part of the upper drum by several millimeters. Then, while pushing the two feet of the measurement gauge against the outer circumference of the upper part of the upper drum (and while applying force to the measurement gauge slightly in the direction of arrow “A”), raise the measurement gauge slowly and remove it. (Refer to Figure 4.)
   Note
   Remove the measurement slowly and carefully so that the probe of the measurement does not contact the drum or video head.

Section 5
Replacement of Main Parts

This section describes the replacement procedure of the periodic replacement parts, the main mechanical parts, the power assembly and the mounted circuit boards.

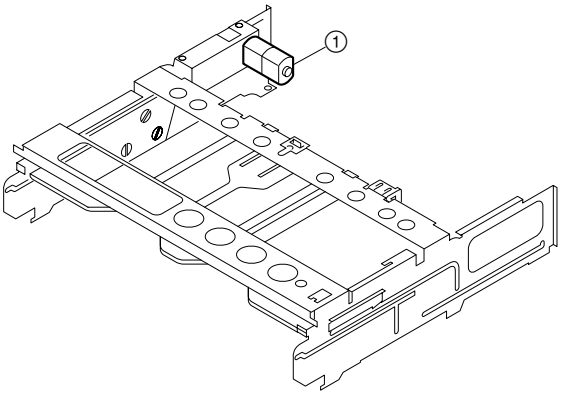
5-1. General Information for Parts Replacement and Adjustment

5-1-1. Index

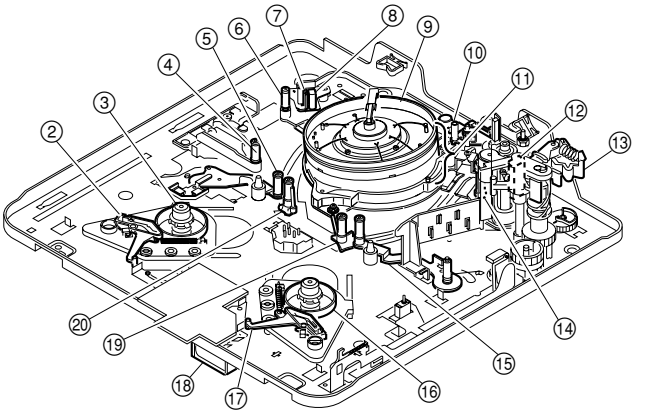
This section describes the replacement procedure of the following parts.

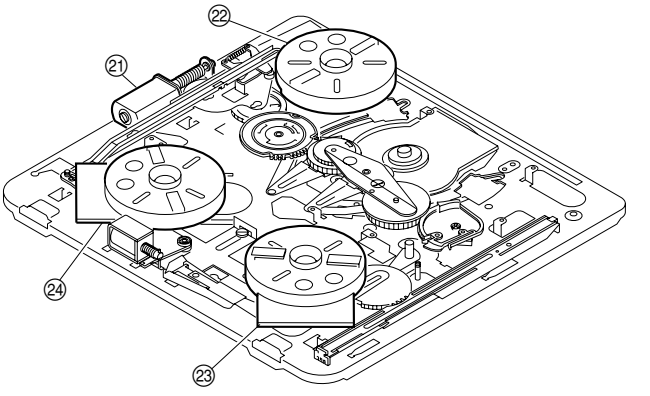
(1) Mechanical parts

No.	Part name	Procedure
①	Cassette compartment motor	Refer to Section 5-14.
②, ⑰	Brake lever assembly	Refer to Section 5-10.
③, ⑯	Reel table assembly	Refer to Section 5-9.
④	S5 guide base assembly	Refer to Section 5-17.
⑤	S-TEN arm assembly	Refer to Section 5-13.
⑥	S3 guide assembly	Refer to Section 5-18.
⑦	Tape cleaner	Refer to Section 5-12.
⑧	CTL head	Refer to Section 5-5.
⑨	Upper drum assembly	Refer to Section 5-2.
⑩	HC roller assembly	Refer to Section 5-4.
⑪	Drum assembly	Refer to Section 5-3.
⑫	AT head	Refer to Section 5-6.
⑬	J pinch roller assembly	Refer to Section 5-7.
⑭	T3 guide roller	Refer to Section 5-16.
⑮	T4 assembly	Refer to Section 5-19.
⑱	Plunger solenoid	Refer to Section 5-21.
⑲	Shuttle T block assembly	Refer to Section 5-15.
⑳	Shuttle S block assembly	Refer to Section 5-15.
㉑	Threading motor assembly	Refer to Section 5-20.
㉒	Capstan motor	Refer to Section 5-8.
㉓, ㉔	Reel motor	Refer to Section 5-11.



<Cassette compartment>



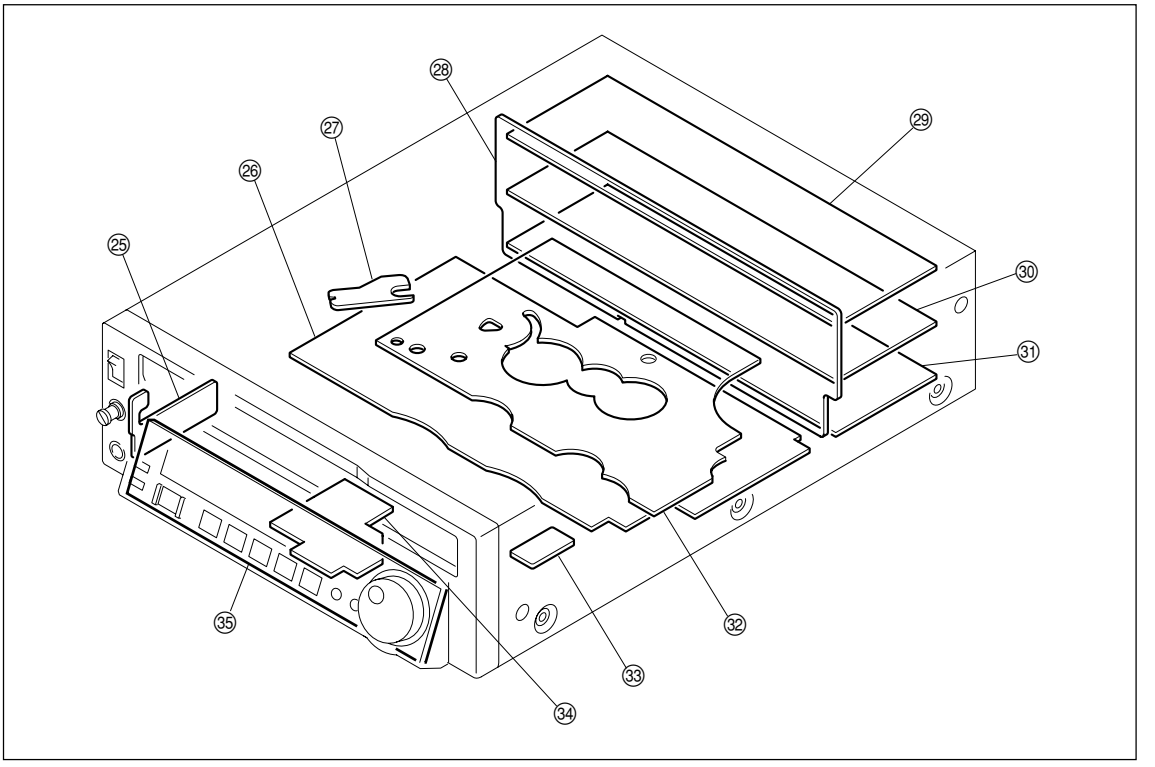


(2) Power assembly and the mounted circuit boards

Note

After replacing any of the following mounted circuit boards (or assembly parts including the following) is replaced, perform the steps after replacement. Refer to Section 1-20.

No.	Part name	Procedure	Steps after replacement
㉕	HP-107	Refer to Section 5-23-5.	Refer to Section 1-20-5.
㉖	DM-124	Refer to Section 5-23-2.	Refer to Section 1-20-2.
㉗	SE-604	Refer to Section 5-23-8.	Refer to Section 1-20-8.
㉘	MB-919	Refer to Section 5-23-7.	Refer to Section 1-20-7.
㉙	Power assembly	Refer to Section 5-22.	–
㉚	DPR-172/174	Refer to Section 5-23-3.	Refer to Section 1-20-3.
㉛	IF-808/826	Refer to Section 5-23-6.	Refer to Section 1-20-6.
㉜	DR-432	Refer to Section 5-23-4.	Refer to Section 1-20-4.
㉝	SE-605	Refer to Section 5-23-9.	Refer to Section 1-20-9.
㉞	CCM-48	Refer to Section 5-23-1.	Refer to Section 1-20-1.
㉟	Fluoresce indicator tube assembly	–	–



5-1-2. Threading-End State and Unthreading-End State

1. Threading-end state

There are two methods as described below to establish the threading-end state with the cassette compartment assembly removed from the unit.

Method 1 (When the main power is ON) :

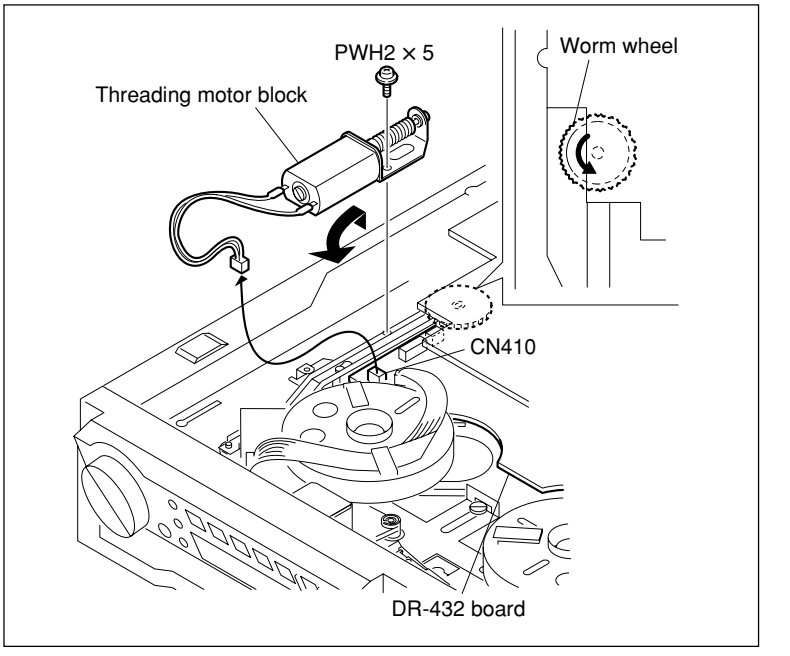
(1) Start up the maintenance mode.
(2) In C012 : THREADING, set the mechanical deck to the threading-end state. (Refer to Section 3-2-2.)

Note

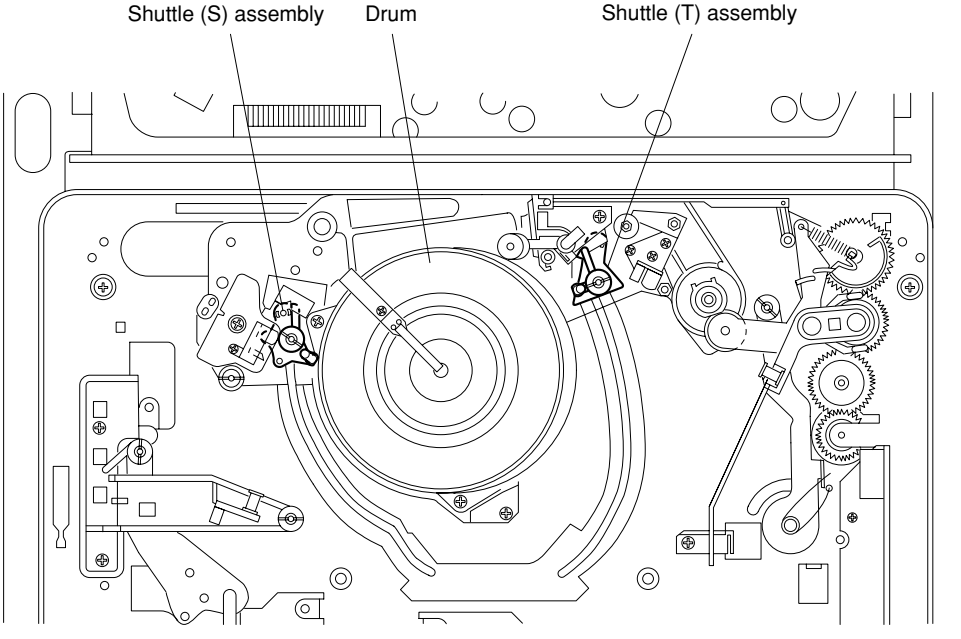
Quitting the C012: THREADING menu returns the mechanical deck to the unthreading-end state.

Method 2 (When the main power is OFF) :

(1) Remove the bottom plate. (Refer to Section 1-4-2.)
(2) Remove the threading motor block. (Refer to Section 5-20.)
(3) Rotate the worm wheel counter-clockwise.



<Threading-end state>



2. Unthreading-end state

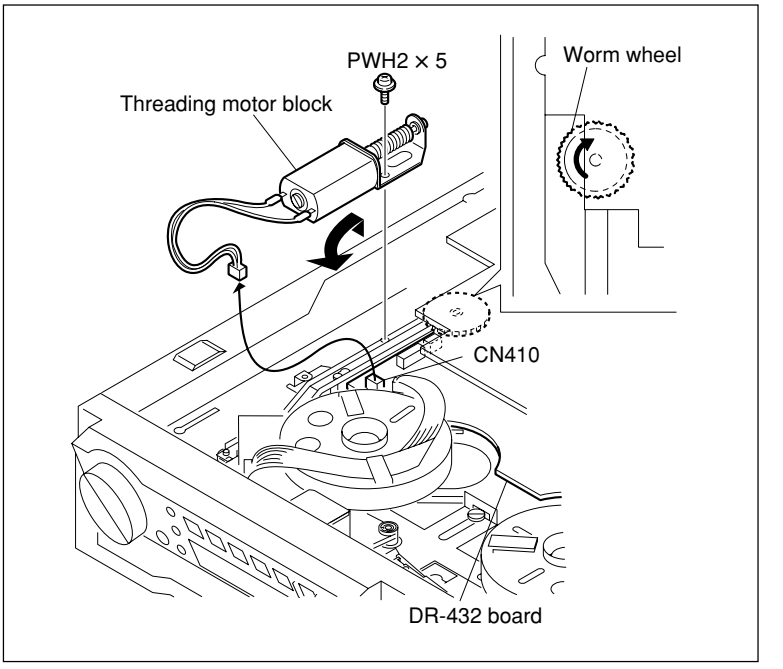
There are two methods as described below to establish the unthreading-end state with the cassette compartment assembly removed from the unit.

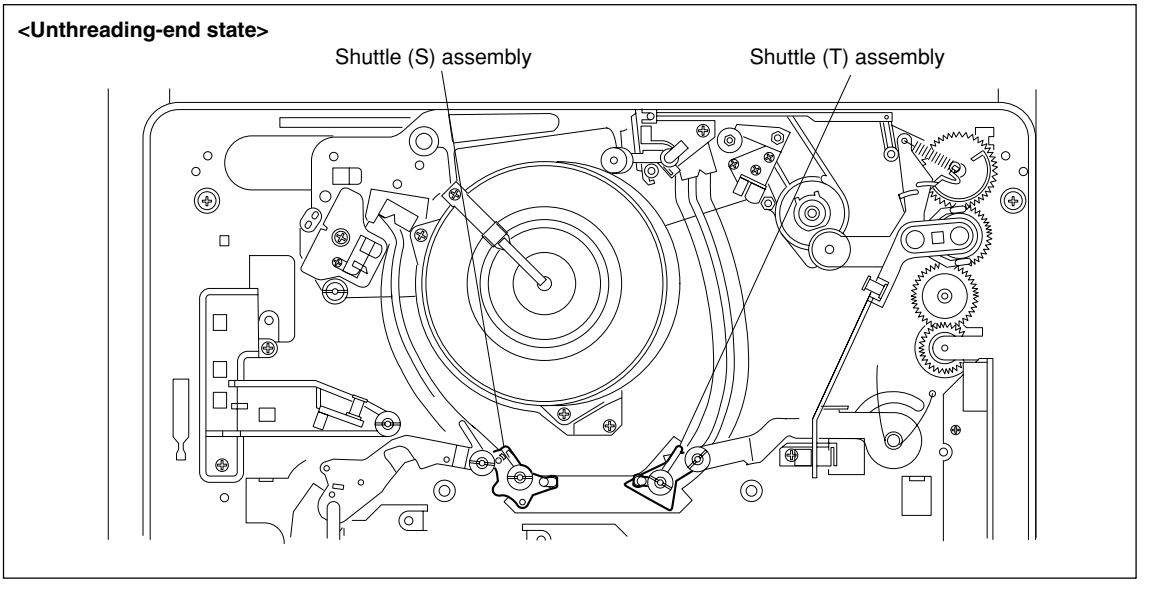
Method 1 (When the main power is ON) :

(1) Start up the maintenance mode.
(2) In C012 : THREADING, set the mechanical deck to the unthreading-end state. (Refer to Section 3-2-2.)

Method 2 (When the main power is OFF) :

(1) Remove the bottom plate. (Refer to Section 1-4-2.)
(2) Remove the threading motor block. (Refer to Section 5-20.)
(3) Rotate the worm wheel clockwise.



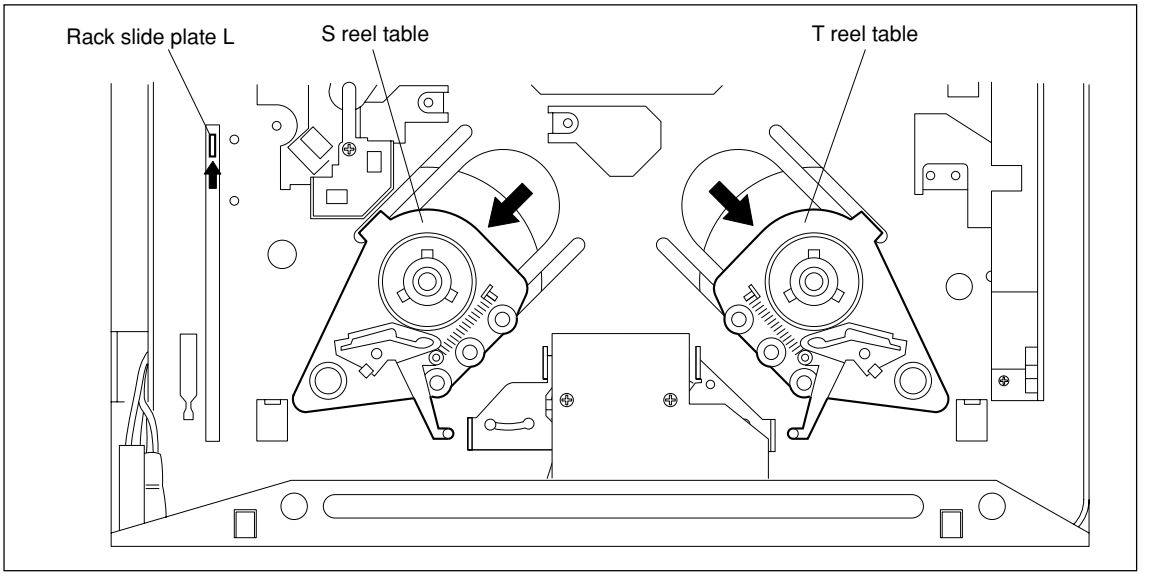


5-1-3. L Cassette Position/S Cassette Position

1. L cassette position

The L cassette position indicates the state of mechanism that the reel tables are located in the specified positions to accept the L cassette.

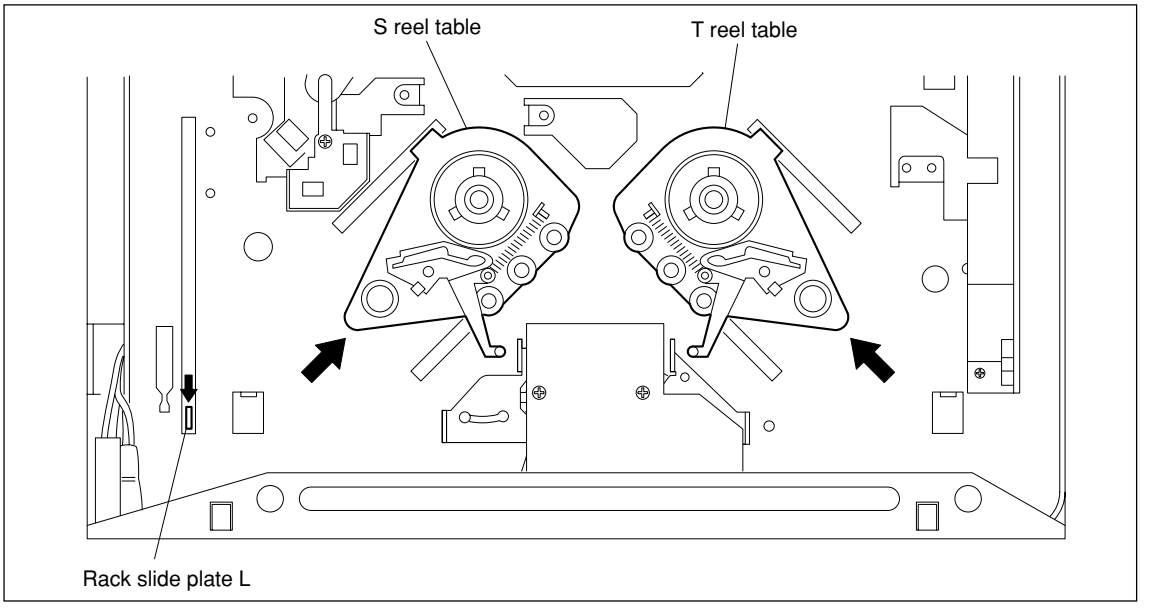
In order to remove the reel tables from the S cassette position to the L cassette position while the cassette compartment assembly is being removed from the unit, slide the rack slide plate L in the direction of the arrow with fingers as far as it can go until it is stopped.



2. S cassette position

The S cassette position indicates the state of mechanism that the reel tables are located in the specified positions to accept the S cassette.

In order to remove the reel tables from the L cassette position to the S cassette position while the cassette compartment assembly is being removed from the unit, slide the rack slide plate L in the direction of the arrow with fingers as far as it can go until it is stopped.



5-1-4. Notes When Replacing Parts

1. About cleaning blade

CAUTION

Never touch the cleaning blade with bare hands.
The cleaning blade is very sharp and it can cut your hands.
Be very careful when replacing or adjusting the peripheral parts.

2. About tools

Be sure to clean the surface of tools before using them.

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

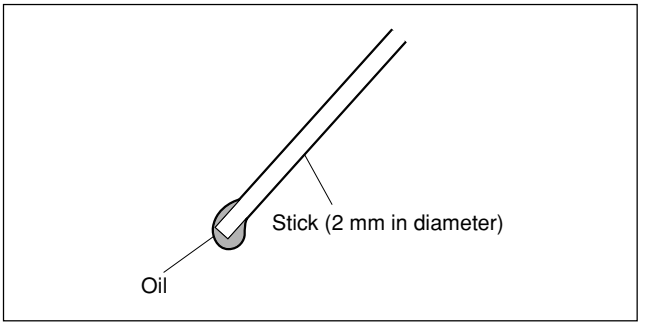
When handling tools, be careful not to damage the tools.
The correct adjustment may not be obtained with the damaged tools.

3. About oil and grease

Be sure to use the specified oil and grease.
If the different oil or grease is used, major malfunction may cause due to the differences in viscosity and ingredients.
If the oil and grease used is mixed with dust, major malfunction may cause.
Be sure to use the following oil and grease in the J-1.

- Moly-coat grease (PG-662) : 7-651-000-59
- Oil (Mitsubishi Diamond hydro-fluid NT-68) : 7-661-018-18

Smear grease onto the surface of the part like a thin film.
If grease smeared spread from the specified areas, be sure to wipe using a gauze or soft cloth.
A drop of oil defines as follows: About the amount of oil that will adhere to the end of a stick (2 mm in diameter) as shown in the figure.
Never use the oil and grease apart from the specified areas.

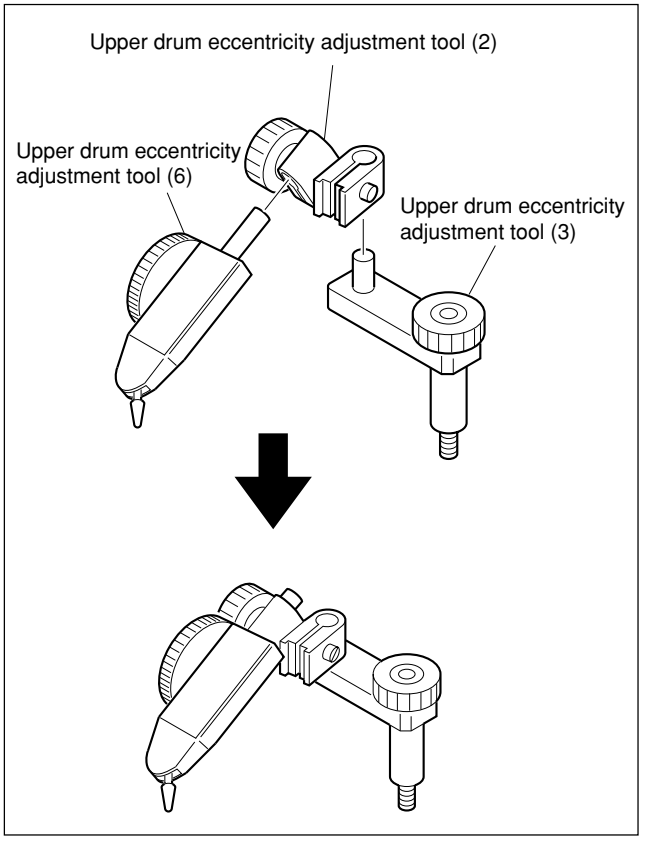


4. About stop washer and E ring

Never re-use the stop washer and the E ring that have been used once.
It is recommended to prepare the quantity of stop washers and E rings a little more than the required quantity by checking the required quantity before starting the replacement work of the part.

5-1-5. Assembling the Upper Drum Eccentricity Adjustment Tools

Assembling the upper drum eccentricity adjustment tools as shown.


Upper drum eccentricity adjustment tool (2)
Upper drum eccentricity adjustment tool (6)
Upper drum eccentricity adjustment tool (3)

5-1-6. Phase Adjustment of the Gears

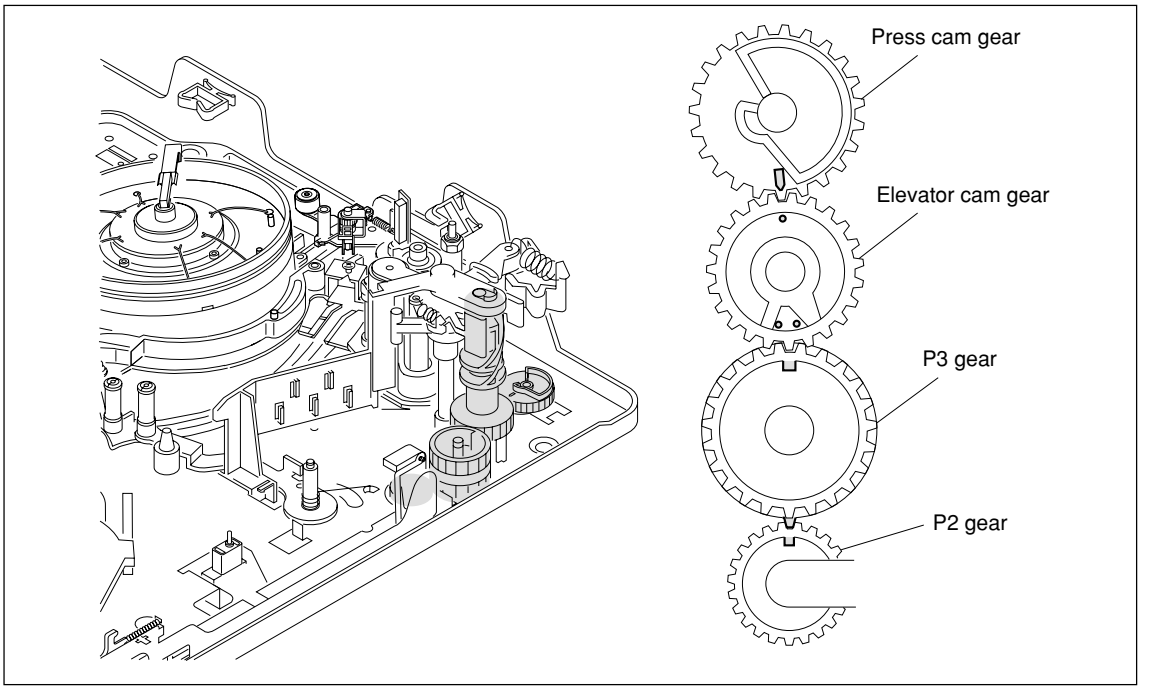
When any of the following gears is removed or replaced, adjust the phase of the gears when installing it.

Note

The gears that are not listed in this section do not need the phase adjustment. Install them as they are.

Press cam gear, Elevator cam gear, P2 gear, P3 gear

Align the marks of the respective gears as shown in the illustration.



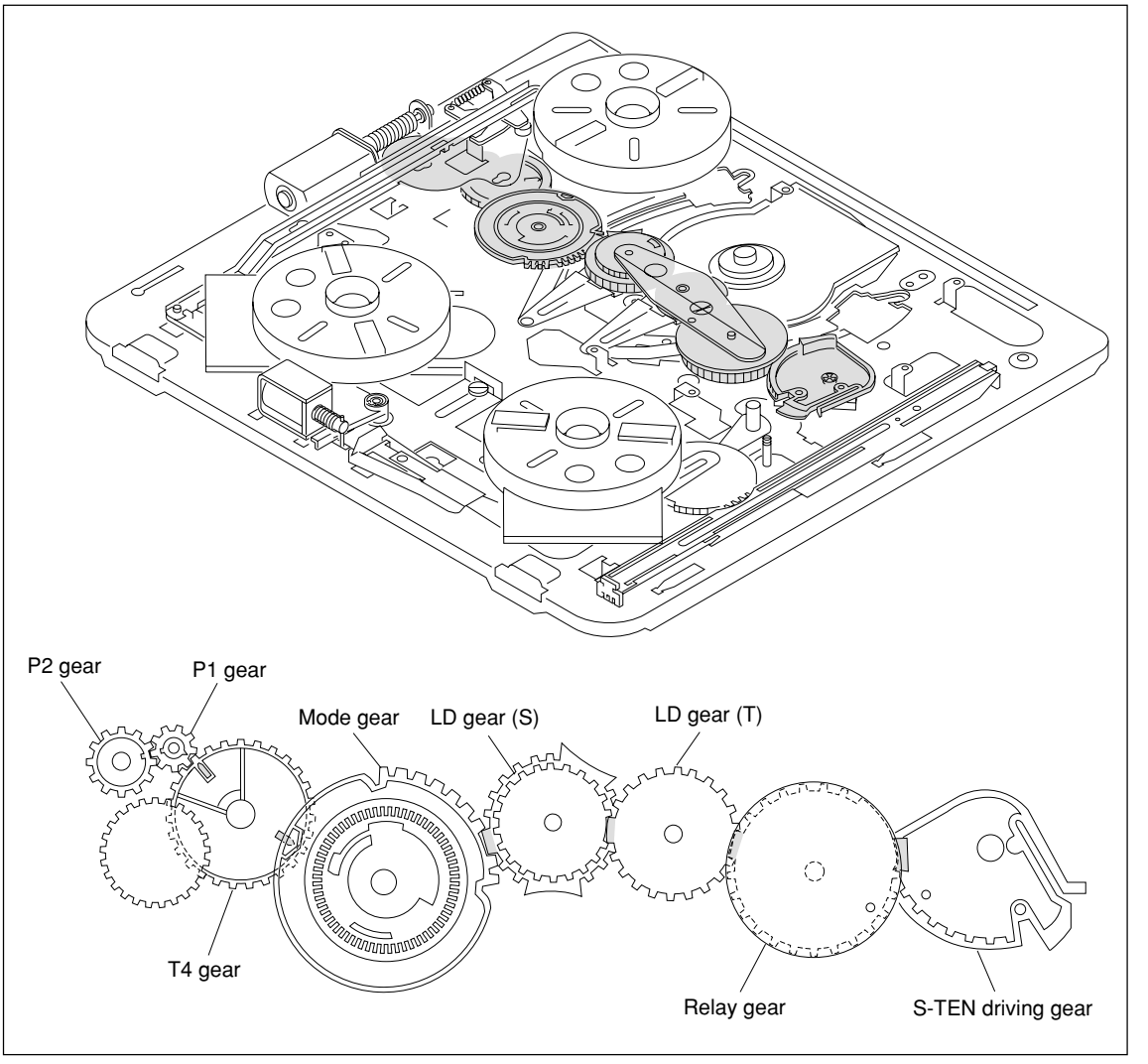
LD gear (S), LD gear (T), P1 gear, P2 gear, S-TEN driving gear, T4 gear, Mode gear, Relay gear

Align the marks of the respective gears as shown in the illustration.

Note

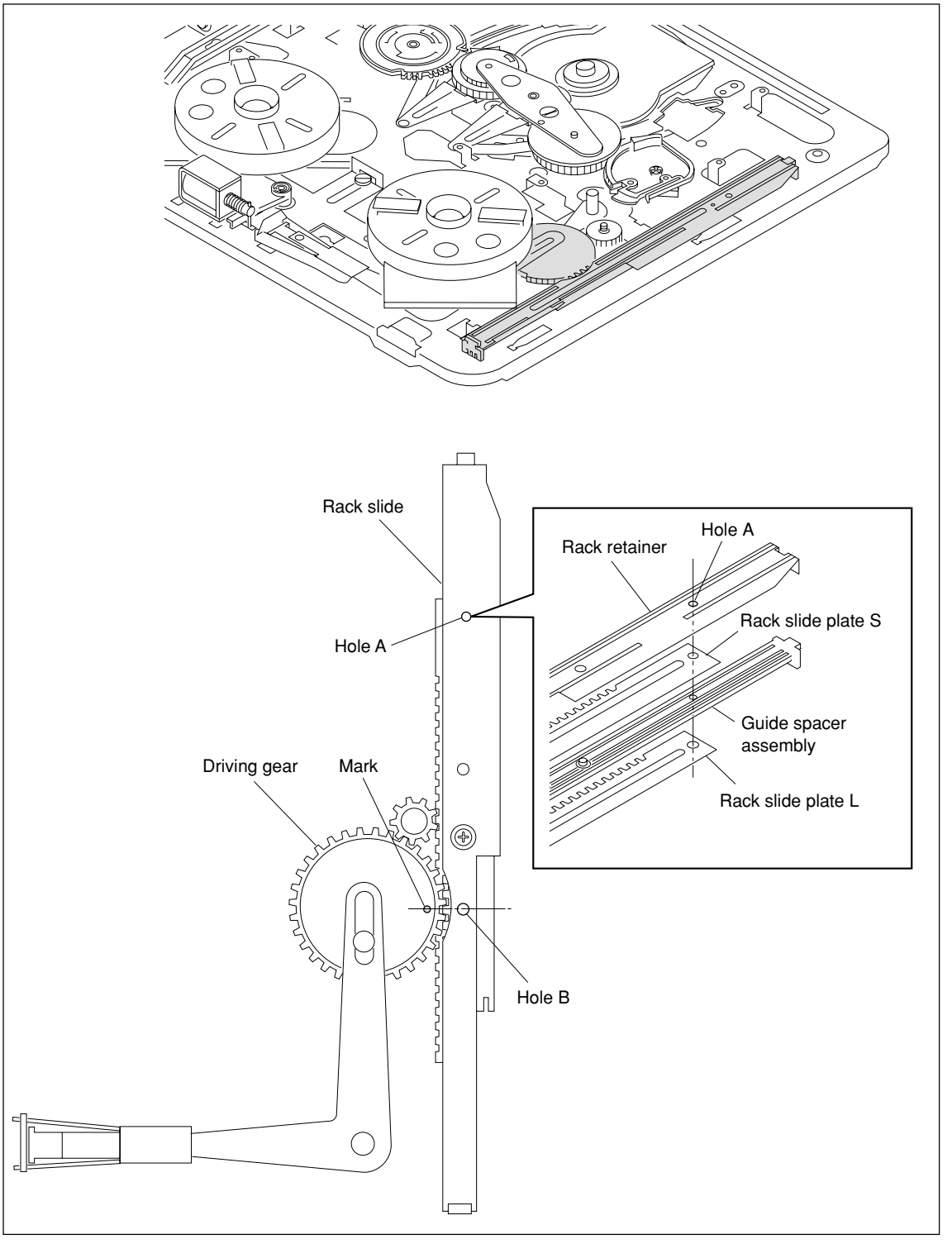
When any of the following gears is removed or replaced or installed, the tension regulator adjustment needs to be implemented. (Refer to Section 5-13-2.)

- Relay gear
- S-TEN driving gear



Rack slide, Driving gear

1. Align the hole positions of the rack slide plate S, rack slide plate L, and guide base assembly with the hoel A of the rack retainer.
2. Align the mark of the driving gear with the hole B of the rack retainer.



5-2. Upper Drum Replacement

CAUTION

If you touch the rapidly rotating drum with hands or screwdriver, you may get hurt by the rapidly rotating drum as the hands or screwdriver will be flipped with a strong force.

- Start cleaning or part replacement after the drum comes to the complete stop.
- Never touch the drum rotating at a high speed during the course of adjustments.

Overview

Replacement

1. Removing the shaft ground assembly
2. Removing the drum cover (J-2/J-3 only)
3. Removing the upper drum assembly
4. Cleaning (mounting surface of the upper drum, flange surface and edge area of the lower drum)
5. Installing the upper drum assembly
6. Installing the upper drum eccentricity adjustment tool
7. Adjusting eccentricity of the upper drum
8. Removing the upper drum eccentricity adjustment tool
9. Reattaching the drum cover (J-2/J-3 only)
10. Installing the shaft ground assembly
11. Cleaning (tape running surface and video heads of the upper drum, tape running surface and rabbet guide of the lower drum)

Adjustments after replacement

12. Installing the cassette compartment assembly (Refer to Section 1-5.)
13. Tape running check (Refer to Section 6-2.)

Note

If the tape curl at the T2 guide cannot be checked easily, remove the VH cleaner assembly. (Refer to Section 5-4.)

14. Video tracking check (Refer to Section 6-3.)
15. CTL head position check (Refer to Section 6-4.)
16. Playback PLL adjustment (Refer to Section 6-5.)
17. Drum phase adjustment (Refer to Section 6-6.)
18. AT head check (Refer to Section 6-7.)
19. Electrical adjustment after drum replacement (Refer to Section 7-2.)

Note

When the video heads wear out or are damaged, replace the upper drum assembly. Head tip alone cannot be replaced.

Basic Information

In addition to the periodic replacement, the upper drum assembly should be replaced when the following symptom occurs.

- A correct RF waveform cannot be obtained even though the tracking adjustment is performed.

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) : J-6325-400-A
Torque screwdriver's bit (for M2) : J-6325-380-A
Torque screwdriver's hexagonal bit (d = 2.5 mm, l = 120 mm) : J-6251-090-A
Cleaning cloth : 3-184-527-01
Cleaning fluid : 9-919-573-01
Upper drum eccentricity adjustment tool (3) : J-6001-820-A
Upper drum eccentricity adjustment tool (2) : J-6001-830-A
Upper drum eccentricity adjustment tool (6) : J-6325-530-A
Soldering iron

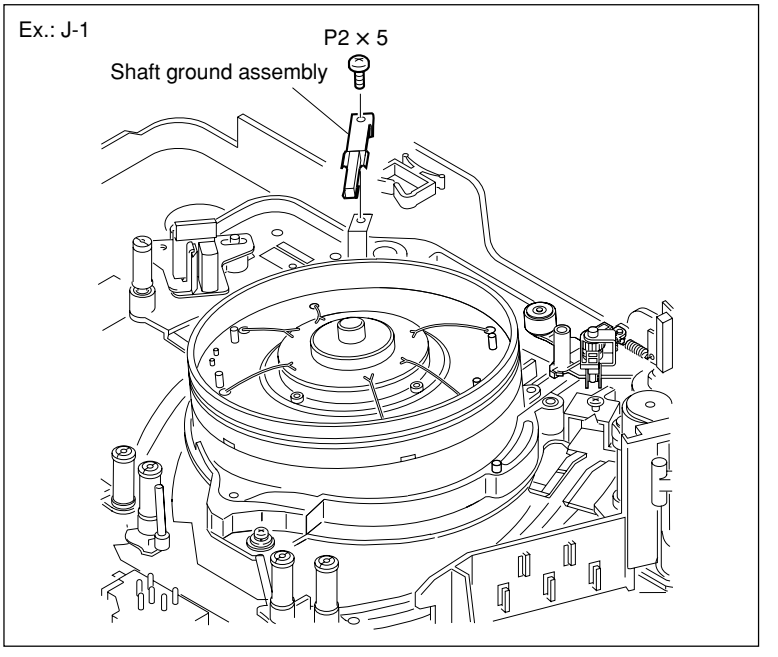
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)
4. Assemble the upper drum eccentricity adjustment tool.

Removal Procedure

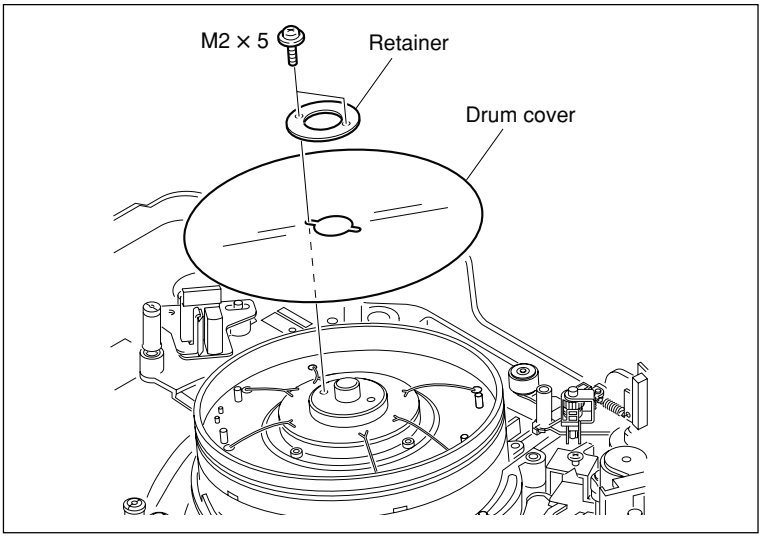
1. Removing the shaft ground assembly

Remove the screw and remove the shaft ground assembly.



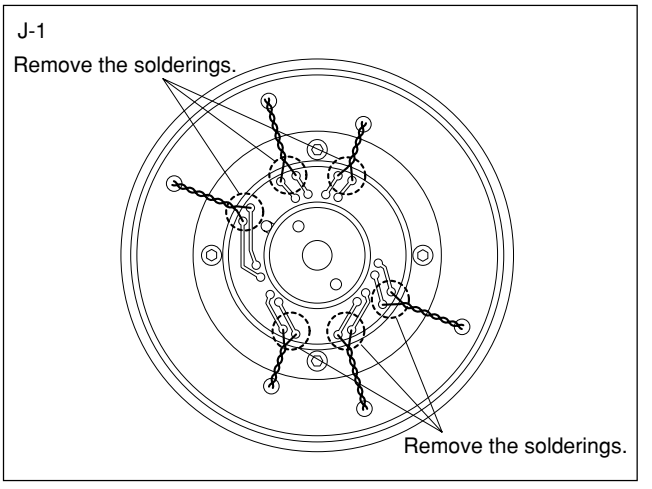
2. Removing the drum cover (J-2/J-3 only)

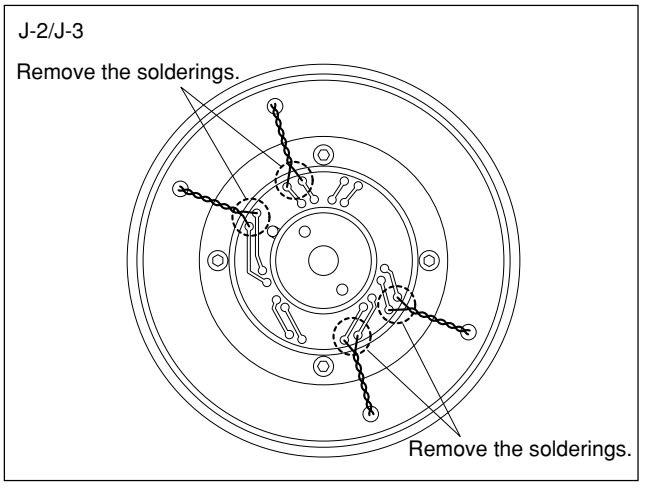
1. Remove the two screws.
2. Remove the retainer and drum cover.



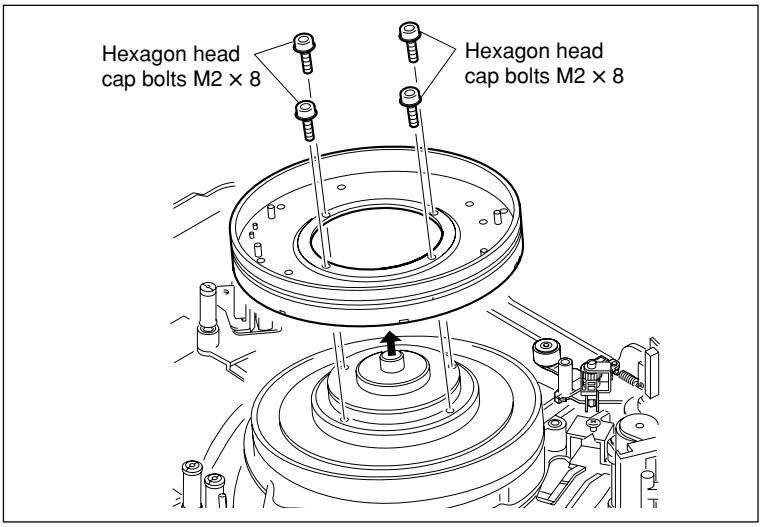
3. Removing the upper drum

(1) Remove the solderings of the harnesses that are connected to the top surface of the upper drum by soldering.
J-1 : 12 solderings
J-2 : 8 solderings
J-3 : 8 solderings





(2) Remove the four hexagon head cap bolts and remove the upper drum in the direction of the arrow.



Installation Procedure

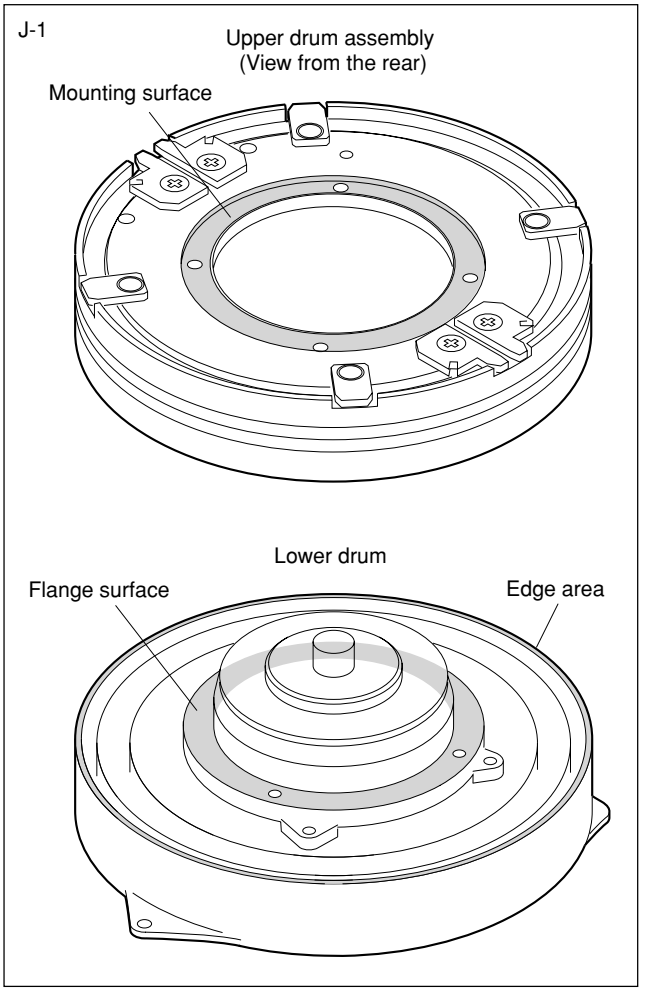
4. Cleaning the mounting surfaces

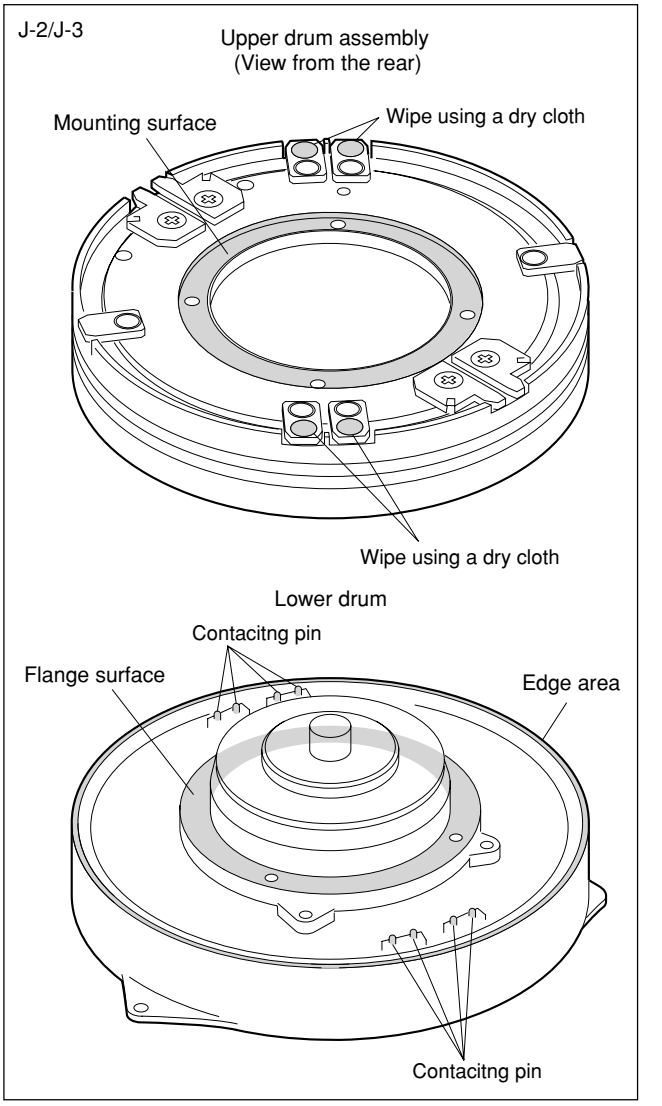
(1) Clean the following areas with the cleaning cloth moistened with the cleaning fluid.
- Mounting surface of the upper drum (The shaded ▭ area shown in the illustration)
- Flange surface and edges of the lower drum (The shaded ▭ area shown in the illustration)

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned areas using a dry clean cloth.

(2) Wipe the following parts with a dry cloth.
- 8 lands (on the four heads) of the new upper drum assembly (2 lands par and head)
- 8 contacting pins of the lower drum

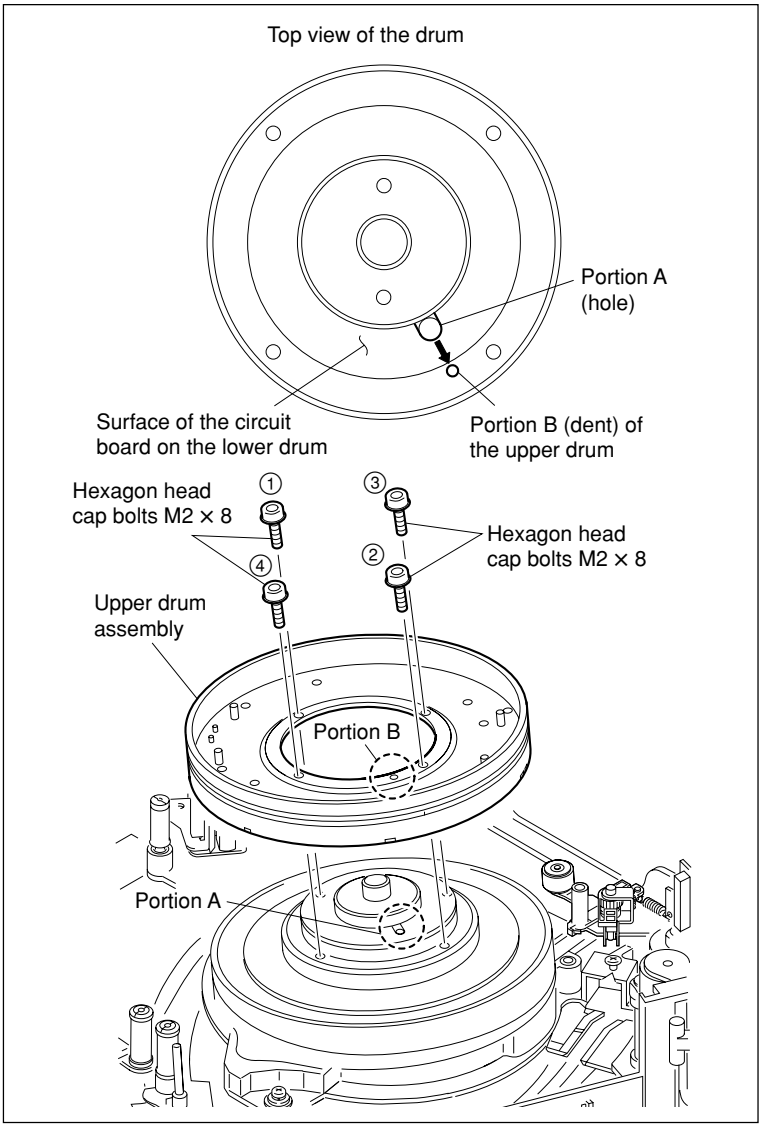




5. Installing the upper drum assembly

(1) While aligning the portion B (dent) of the upper drum with the portion A (hole) of the circuit board on the lower drum, install the upper drum assembly to the lower drum.

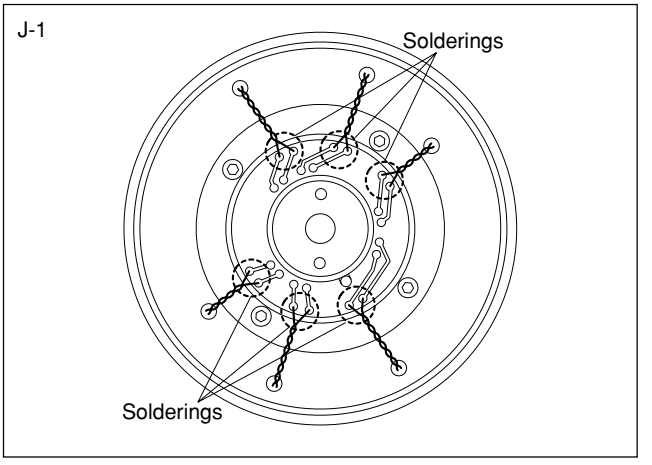
(2) Install the four hexagon head cap bolts in the order as shown in the illustration tentatively.

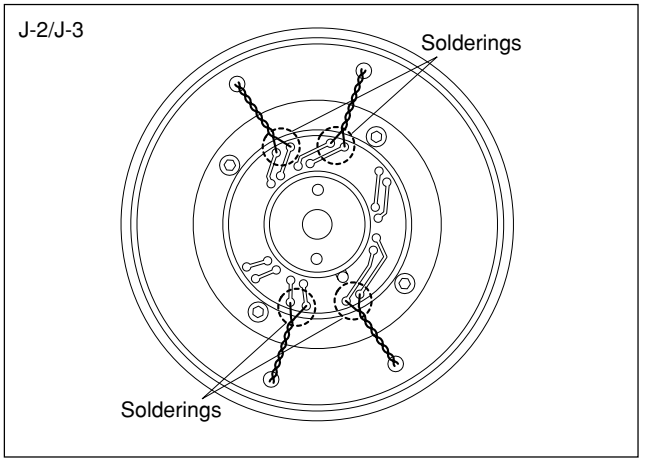


(3) Connect the harnesses that is removed in step 3, as shown in the illustration by soldering.

Note

Check that the soldering is performed properly.





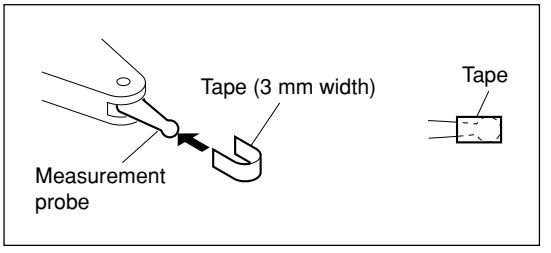
6. Installing the upper drum eccentricity adjustment tool

(1) Assemble the upper drum eccentricity adjustment tool. (Refer to Section 5-1-5.)

(2) Clean the measurement probe of the tool with the cleaning cloth moistened with the cleaning fluid.

Notes

- If the measurement probe is used with dust or foreign materials being attached on it, it can give scars on the upper drum assembly.
- If the measurement probe is made of a metallic part, it is recommended to attach the smooth tape of the size as shown, on the measurement probe's tip in order to prevent the upper drum assembly from damage during the eccentricity adjustment.



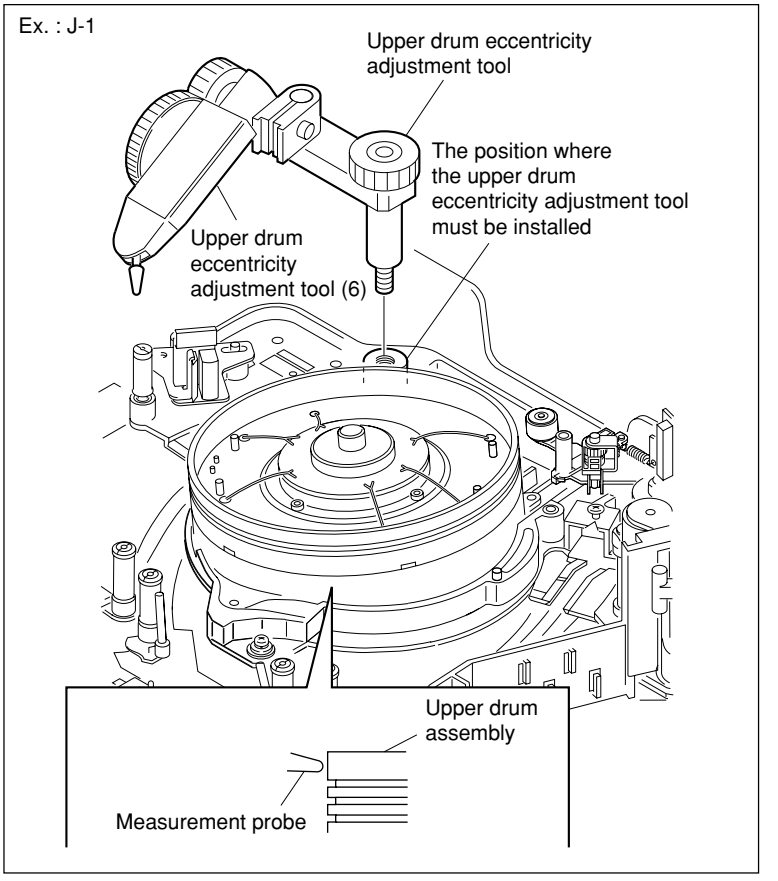
(3) Install the upper drum eccentricity adjustment tool loose so that the measurement probe does not contact the drum assembly.

(4) Adjust inclination of the upper drum eccentricity adjustment tool (6) so that the measurement probe is positioned above the topmost groove on the outer circumference of the upper drum assembly.

Note

Be careful never contact the measurement probe with the video heads.

(5) Contact the measurement probe to the outer circumference of the upper drum assembly, and tighten the screw fixing the upper drum eccentricity adjustment tool.


Ex. : J-1
Upper drum eccentricity adjustment tool
The position where the upper drum eccentricity adjustment tool must be installed
Upper drum eccentricity adjustment tool (6)
Upper drum assembly
Measurement probe

7. Adjusting eccentricity of the upper drum

(1) Rotate the upper drum assembly slowly counter-clockwise and take reading of the tool's pointer. Check that amount of the deflection of the tool's pointer during one full rotation of the upper drum, meets the following specification.
Specification : 3 μm or less

Note

A scale of the tool is in units of 1 μm (0.001 mm).

If the specification does not meet, repeat the following steps of (a) to (c) to repeat adjustment until the specification meets.

(a) Rotate the upper drum assembly slowly counter-clockwise to check the maximum value of the tool's pointer reading and its minimum value during one full rotation of the upper drum assembly.
(b) Rotate the upper drum assembly and stop it at the position that gives the minimum value of the tool's pointer deflection.
(c) So that the tools pointer gives the reading that is half way (1/2) between the maximum and the minimum values of deflection pointer, push the upper drum assembly at the position that is 180 degrees opposite to tools probe in the direction toward the tools probe (in the direction of arrow Ⓐ).

Note

If the tool's reading does not move even when the upper drum assembly is pushed by the fingers, loosen slightly the four hexagon head cap screws securing the upper drum assembly.
On the contrary, if the tool's pointer moves too easily when pressed, tighten the hexagon head cap screws a little.

(2) After adjustment, check that the specification is met by performing the step 1 again.
(3) Tighten the bolts securing the upper drum assembly in the order as shown below with the following tightening torque.
Tightening torque : 10×10^{-2} N•m {1 kgf•cm}

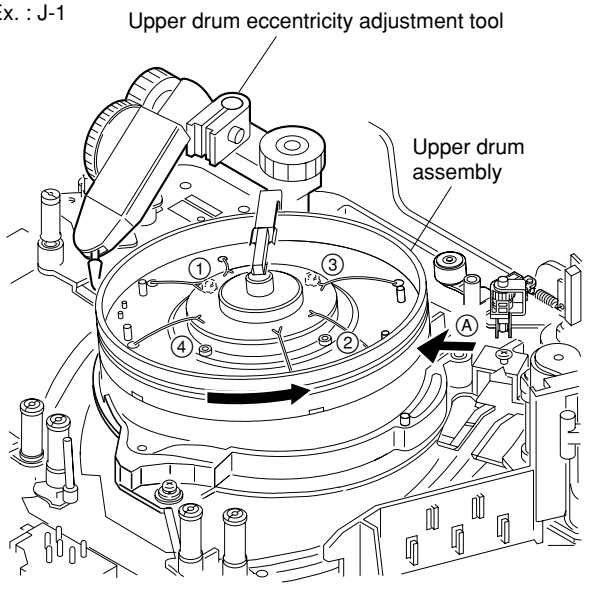
Note

① : The bolt that is nearest to the measurement probe.
② : The bolt that is opposite to the bolt ①.
③ : The bolt that is located in the left of the bolt ②.
④ : The bolt that is positioned opposite to the bolt ③.

(4) Perform step (1) to re-check that the specification is met.
(5) Increase the tightening torque as shown below and tighten the bolts that are tightened in step (2) again in the same order of bolts
Tightening torque : 25×10^{-2} N•m {2.5 kgf•cm}

(6) Perform step (1) again to re-check that the specification is met.

Ex. : J-1



8. Removing the upper drum eccentricity adjustment tool

(1) Loosen the screws fixing the upper drum eccentricity adjustment tool, and detach the measurement probe from the drum assembly.
(2) Remove the tool while being careful that the measurement probe never contacts the drum assembly.

9. Reattaching the drum cover (J-2/J-3 only)

Reattach the retainer and drum cover with the two screws (Refer to step 2.)

10. Installing the shaft ground assembly

Install the shaft ground assembly by reversing the steps of removal.
(Refer to step 1.)

11. Cleaning the drum assembly

(1) Clean the tape running surface and the video heads of the upper drum. (Refer to Section 4-2-3.)
(2) Clean the tape running surface and the rabbet guide of the lower drum. (Refer to Section 4-2-4.)

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned areas using a dry clean cloth.

Adjustments after Replacement

12. Installing the cassette compartment assembly

(Refer to Section 1-5.)

13. Tape running check

(Refer to Section 6-2.)

14. Video tracking check

(Refer to Section 6-3.)

15. CTL head position check

(Refer to Section 6-4.)

16. Playback PLL adjustment

(Refer to Section 6-5.)

17. Drum phase adjustment

(Refer to Section 6-6.)

18. AT head check

(Refer to Section 6-7.)

19. Electrical adjustment after drum replacement

(Refer to Section 7-2.)

5-3. Drum Assembly Replacement

CAUTION

If you touch the rapidly rotating drum with hands or screwdriver, you may get hurt by the rapidly rotating drum as the hands or screwdriver will be flipped with a strong force.

- Start cleaning or part replacement after the drum comes to the complete stop.
- Never touch the drum rotating at a high speed during the course of adjustments.

Overview

Replacement

1. Removing the VH cleaner assembly
2. Removing the drum assembly
3. Cleaning the mounting surfaces (the drum assembly and the drum base assembly)
4. Installing the drum assembly
5. Installing the VH cleaner assembly (Refer to Section 5-4, step 3.)
6. Cleaning (tape running surface and video heads of the upper drum, tape running surface and rabbet guide of the lower drum)

Adjustments after replacement

7. Drum motor operation check (C015: DRUM MOTOR) (Refer to Section 3-2-2.)
8. Tape running adjustment (Refer to Section 6-2.)
9. Video tracking check (Refer to Section 6-3.)
10. CTL head position check (Refer to Section 6-4.)
11. Playback PLL adjustment (Refer to Section 6-5.)
12. Drum phase adjustment (Refer to Section 6-6.)
13. AT head check (Refer to Section 6-7.)
14. Tape running recheck (Refer to Section 6-2.)
15. Electrical adjustment after drum replacement (Refer to Section 7-2.)

Note

When making an attempt to remove or to install the drum assembly, be very careful not to contact nor damage the AT head, CTL head and their peripheral tape guides.

Basic Information

In addition to the periodic replacement, the drum assembly should be replaced when the following symptom occurs.

- When the tape running surface of the lower drum is damaged by scars that cannot be restored.
- When the correct RF waveform cannot be obtained even though the tracking adjustment is performed, due to wear of the lower drum.
- When the VTR cannot meet its specifications due to noise or jitter caused by the lift of bearings.

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) :	J-6325-400-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)

Removal Procedure

1. Removing the VH cleaner assembly

(1) Remove the screw (PSW2.6 × 5.8).
(2) Remove the VH cleaner assembly in the direction of the arrow.

Note

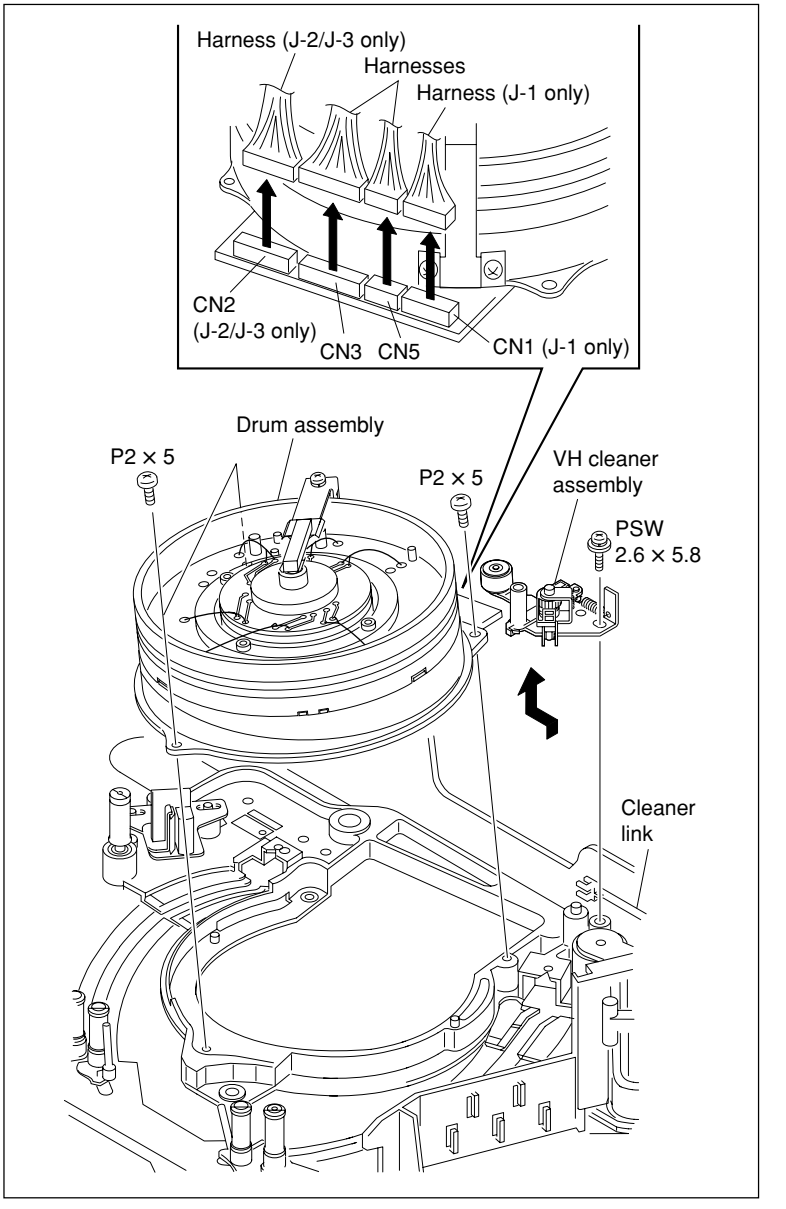
Coupling with the cleaning link is disengaged by itself.

2. Removing the drum assembly

(1) Disconnect the harness from the connectors of the drum assembly.
J-1 : CN1, CN3, and CN5
J-2 : CN2, CN3, and CN5
J-3 : CN2, CN3, and CN5
(2) Remove the three screws (P2 × 5) and remove the drum assembly.

Note

When making an attempt to remove or to install the drum assembly, be very careful not to contact nor damage the AT head, CTL head and their peripheral tape guides.



Installation Procedure

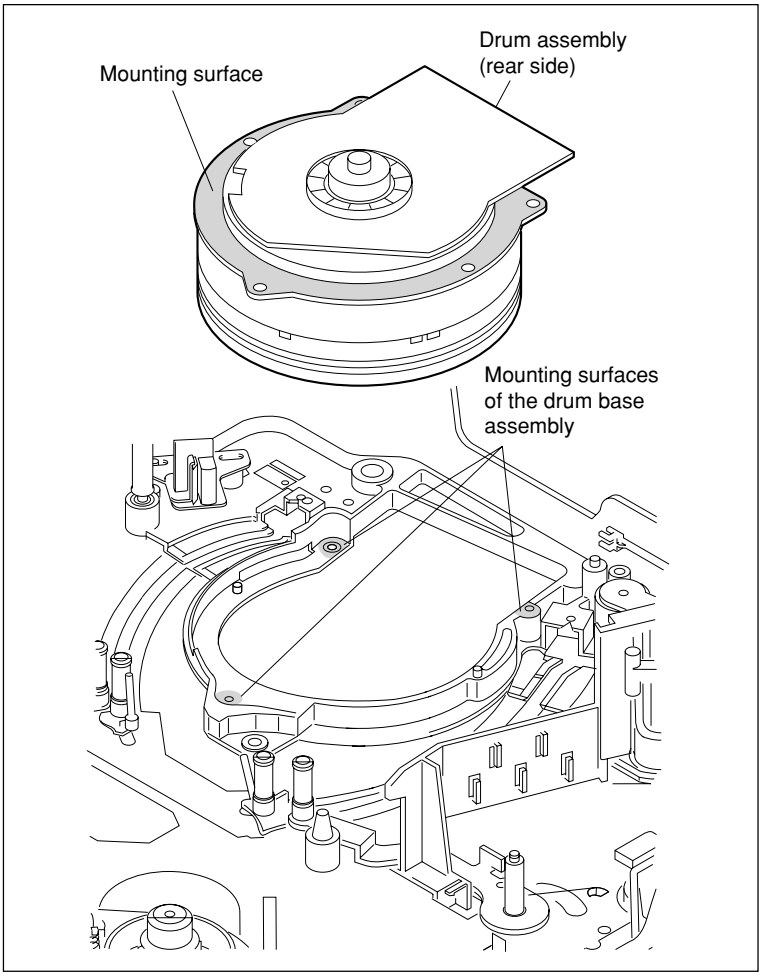
3. Cleaning the mounting surfaces

Clean the following areas with the cleaning cloth moistened with the cleaning fluid.

- Mounting surface of the new drum assembly (The shaded ▭ area shown in the illustration)
- Mounting surfaces of the drum base assembly (The shaded ▭ area shown in the illustration)

Note

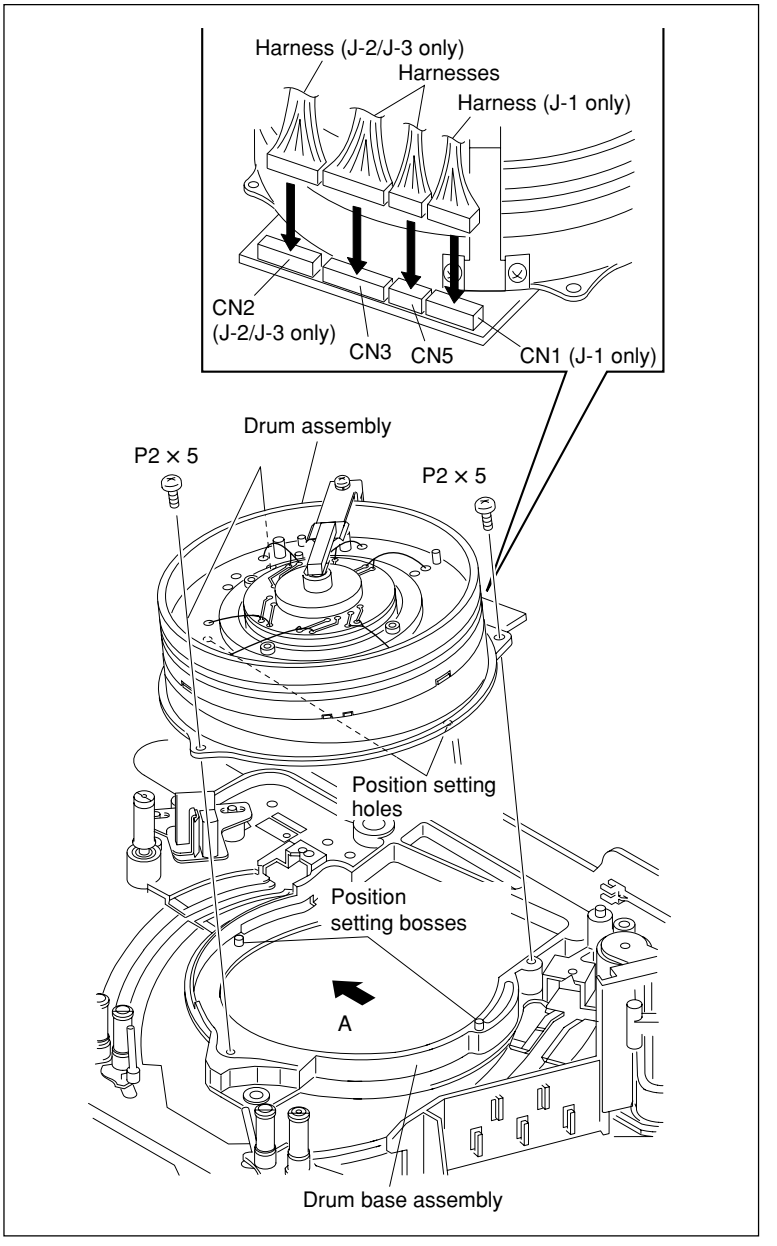
After cleaning, be sure to wipe the cleaning fluid off the cleaned areas using a dry clean cloth.



4. Installing the drum assembly

(1) Align the positioning hole of the drum assembly to the positioning boss of the drum base assembly. Then place the drum assembly on the drum base assembly.
(2) Tentatively fix the drum assembly with the three screws.
(3) While pushing the drum assembly in the direction of the arrow A as far as it can go, tighten the three screws fixing the drum assembly.
Tightening torque : 20×10^{-2} N•m {2 kgf•cm}

(4) Connect the three harnesses to the connectors on the drum assembly.



5. Installing the VH cleaner assembly

Install the VH cleaner assembly that is removed in step 1, with the screw (PSW2.6 × 5.8) and connect it with the cleaner link. (Refer to Section 5-2, step 3.)

6. Cleaning the drum assembly

(1) Clean the tape running surface and the video heads of the upper drum.
(Refer to Section 4-2-3.)
(2) Clean the tape running surface and rabbet guide of the lower drum.
(Refer to Section 4-2-4.)

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned areas using a dry clean cloth.

Adjustments after Replacement

7. Drum motor operation check (C015: DRUM MOTOR)
(Refer to Section 3-2-2.)

8. Tape running adjustment
(Refer to Section 6-2.)

9. Video tracking check
(Refer to Section 6-3.)

10. CTL head position check
(Refer to Section 6-4.)

11. Playback PLL adjustment
(Refer to Section 6-5.)

12. Drum phase adjustment
(Refer to Section 6-6.)

13. AT head check
(Refer to Section 6-7.)

14. Tape running recheck
(Refer to Section 6-2.)

15. Electrical adjustment after drum replacement
(Refer to Section 7-2.)

5-4. HC Roller Assembly Replacement

Overview

Replacement

1. Removing the VH cleaner assembly
2. Replacing the HC roller assembly
3 Installing the VH cleaner assembly

Note

Stop washer is used to fix the HC roller assembly.
Prepare the new stop washer (3-349-859-31) when the HC roller assembly is replaced.
Never re-use the stop washer.

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Check that the mechanical deck is in the unthreading-end state. (Refer to Section 5-1-2.)

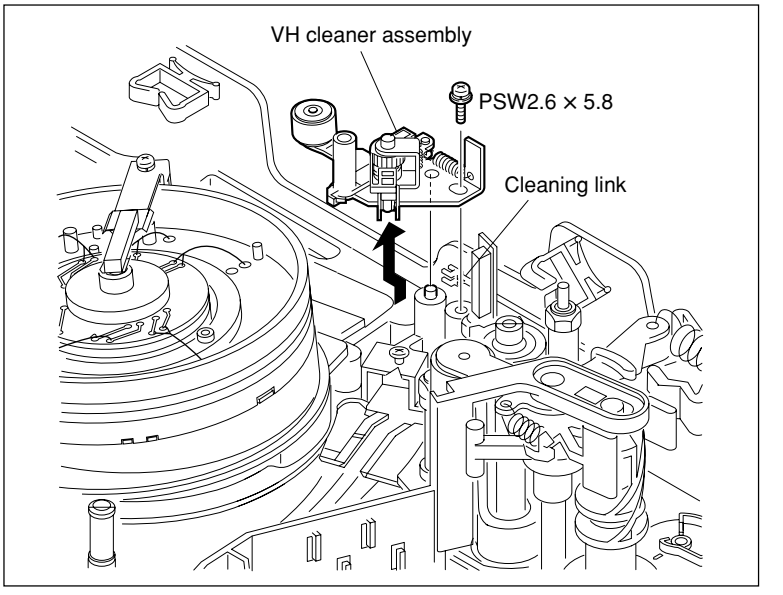
Removal/Installation Procedure

1. Removing the VH cleaner assembly

(1) Remove the screw (PSW2.6 × 5.8).
(2) Remove the VH cleaner assembly in the direction of the arrow.

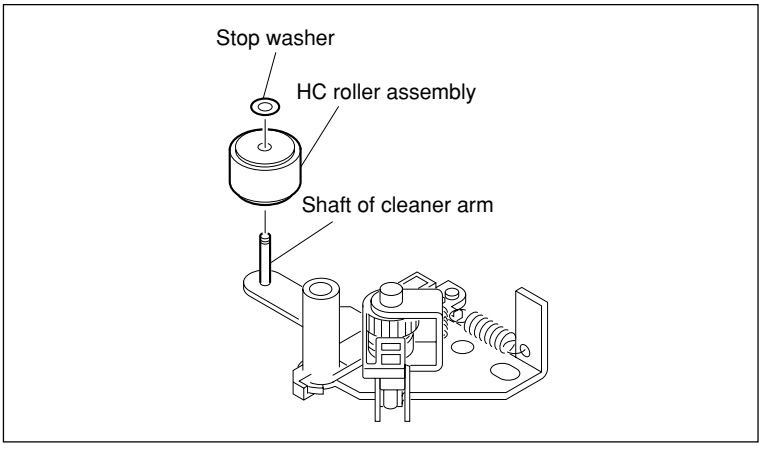
Note

Coupling with the cleaning link is disengaged by itself.



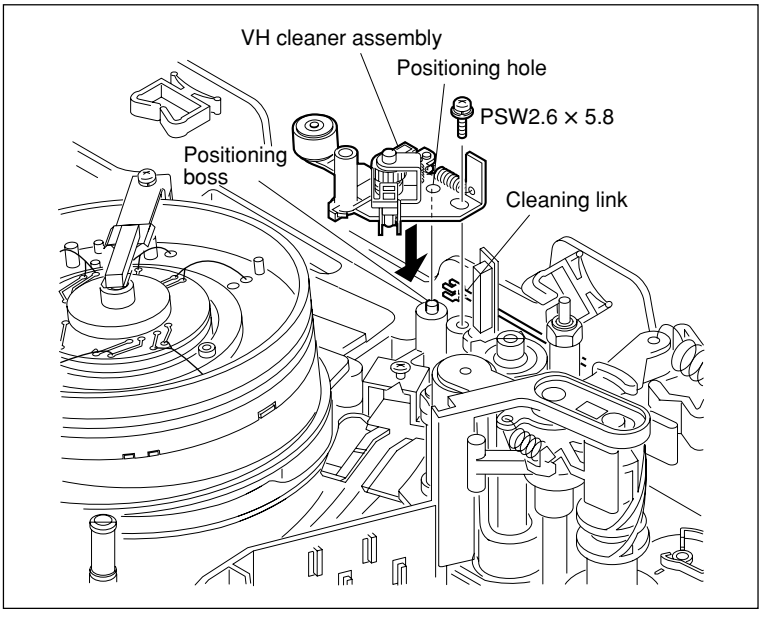
2. Replacing the HC roller assembly

(1) Remove the stop washer and remove the HC roller assembly from the shaft of the cleaner arm.
(2) Insert the new HC roller assembly into the shaft of the cleaner arm.
(3) Fix the HC roller assembly to the shaft of the cleaner arm with the new stop washer.

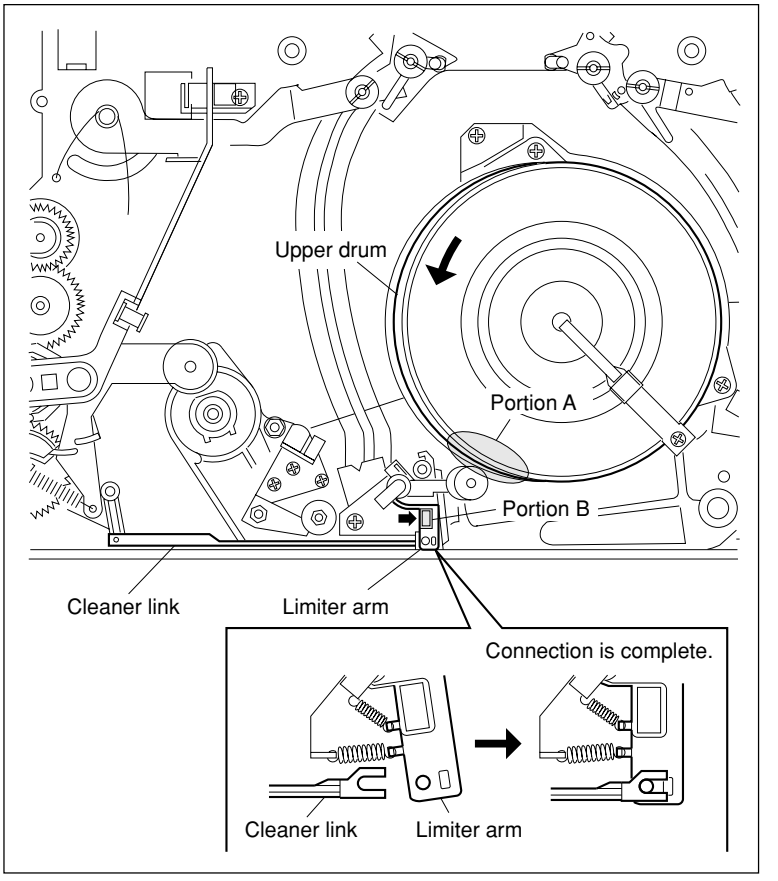


3. Installing the VH cleaner assembly

(1) Align the positioning hole of the VH cleaner assembly to the positioning boss. Then fix it with the screw.



(2) Rotate the upper drum counter-clockwise up to the position where the heads do not appear in the portion A.
(3) Push the portion B of the limiter arm in the direction of the arrow until the cleaner link is removed from the limiter arm.
(4) Connect the cleaner link to the limiter arm correctly.



5-5. CTL Head Replacement

When the CTL head needs to be replaced, replace the entire AC head.

Overview

Replacement

1. Removing the CTL head sub assembly
2. Removing the tape cleaner assembly
3. Installing the tape cleaner assembly
4. Installing the CTL head sub assembly
5. Cleaning the CTL head and the cleaning blade (Refer to Section 4-2-5.)

Adjustments after replacement

6. Tape running check (Refer to Section 6-2.)
7. Video tracking check and adjustment (Refer to Section 6-3.)
8. CTL head position check and adjustment (Refer to Section 6-4.)
9. AT head check (Refer to Section 6-7.)
10. Applying locking compound (Refer to Section 6-1-9.)

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) : J-6325-400-A
Torque screwdriver's bit (for M2) : J-6325-380-A
Cleaning cloth : 3-184-527-01
Cleaning fluid : 9-919-573-01

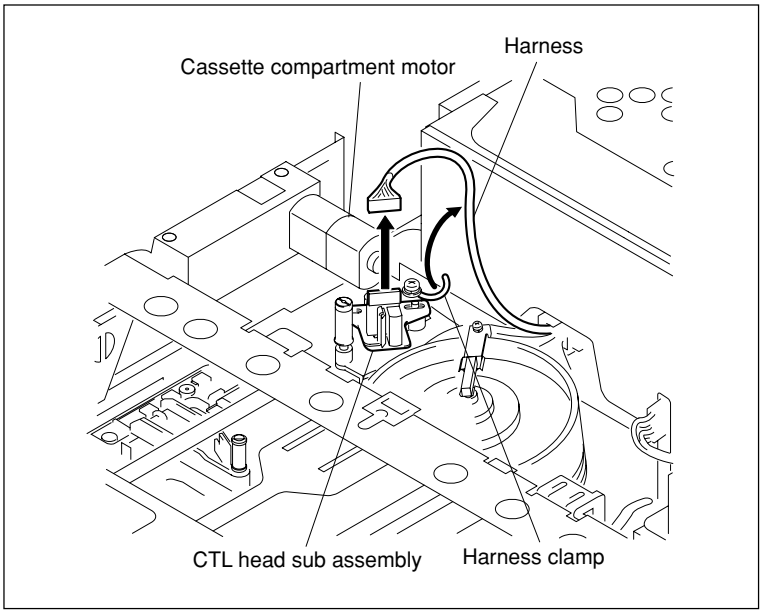
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)

Removal Procedure

1. Removing the CTL head sub assembly

(1) Release the harness from the harness clamp.
(2) Disconnect the harness from the CTL head sub assembly.



(3) Remove the screw (PSW2.6 × 5.8) and remove the CTL head sub assembly.

Note

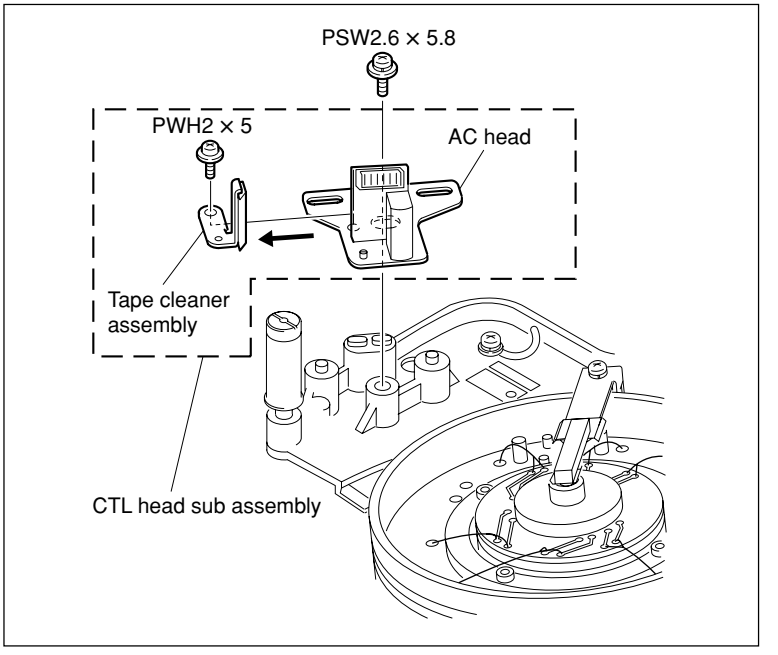
When removing the screw, be careful not to contact anything such as screwdriver strong against the cassette compartment motor.

2. Removing the tape cleaner assembly

Remove the screw (PWH2 × 5) and remove the tape cleaner assembly.

CAUTION

Be careful of the sharp edge of the cleaning blade of the tape cleaner assembly.



Installation Procedure

3. Installing the tape cleaner assembly

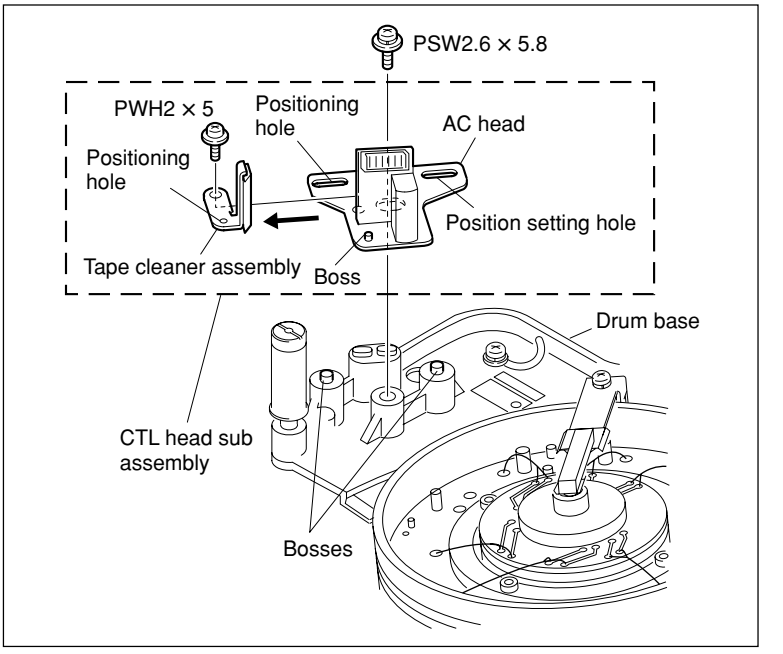
Align the positioning hole of the tape cleaner assembly to the boss of the AC head. Then fix it with the screw (PWH2 × 5).

CAUTION

Be careful of the sharp edge of the cleaning blade of the tape cleaner assembly.

4. Installing the CTL head sub assembly

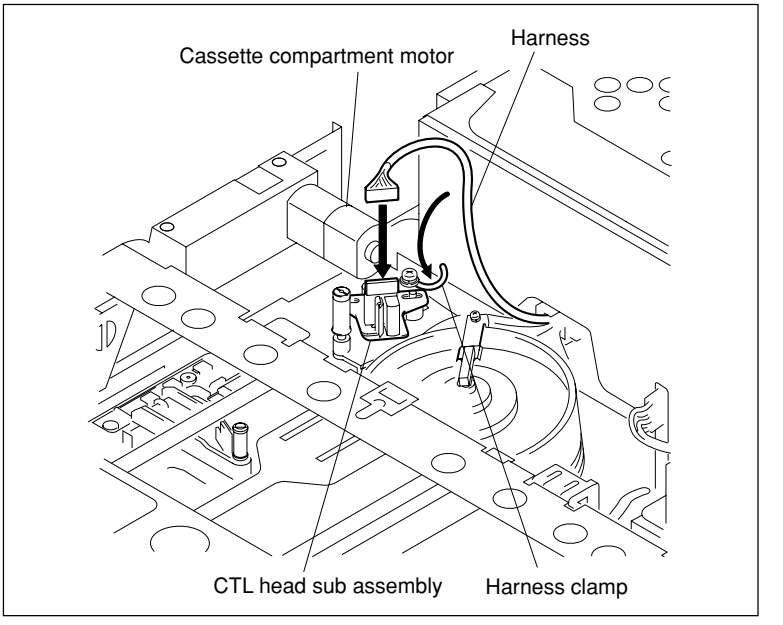
(1) Align the positioning holes of the CTL head sub assembly to the bosses. Then fix it to the drum base with the screw (PSW2.6 × 5.8).



(2) Connect the harness to the CTL head sub assembly. Fix the harness with the harness clamp.

Note

Fix the harness that is connected to the CTL head sub assembly in the way that it does not contact with the terminals of the cassette compartment motor.



5. Cleaning the CTL head and the cleaning blade

(Refer to Section 4-2-5.)

Adjustments after Replacement

6. Tape running check
(Refer to Section 6-2.)

7. Video tracking check and adjustment
(Refer to Section 6-3.)

8. CTL head position check and adjustment
(Refer to Section 6-4.)

9. AT head check
(Refer to Section 6-7.)

10. Applying locking compound
(Refer to Section 6-1-9.)

5-6. AT Head Replacement

Replace the AT head as a single part normally.

5-6-1. Replacement of the AT Head as a Single Part

Overview

Replacement

1. Replacing the AT head
2. Cleaning the AT head (Refer to Section 4-2-5.)

Adjustments after replacement

3. AT head zenith check and adjustment (Refer to Section 5-6-3.)
4. Tape running check (Refer to Section 6-2.)
5. Video tracking check (Refer to Section 6-3.)
6. CTL head position check (Refer to Section 6-4.)
7. AT head check and adjustment (Refer to Section 6-7.)
8. Electrical adjustment after AT head replacement (Refer to Section 7-3.)
9. Applying locking compound (Refer to Section 6-1-9.)

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) :	J-6325-400-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01

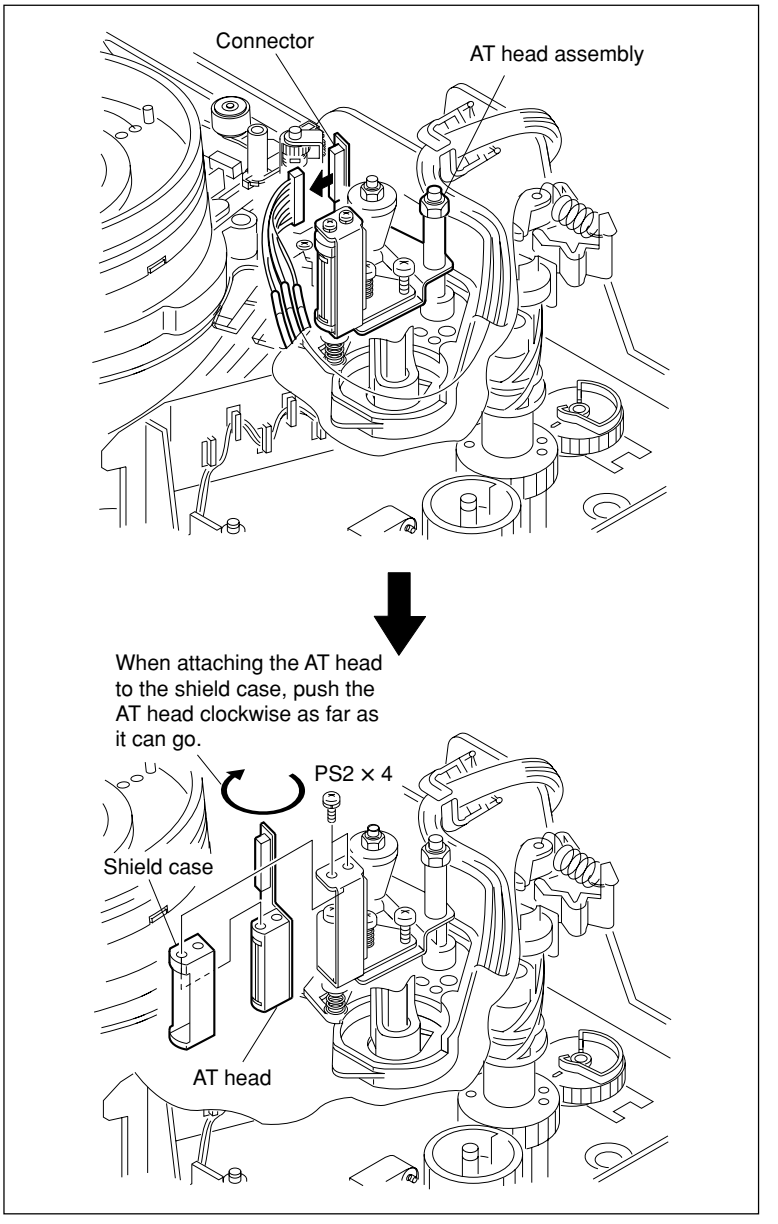
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)

Removal/Installation Procedure

1. Replacing the AT head

(1) Disconnect the harness from the connector of the AT head assembly.
(2) Remove the two fixing screws and remove the entire AT head including the shield.
(3) Take off the shiled case on the AT head.
(4) Insert the new AT head into the shield case and fix the AT head tentatively with the two fixing screws.
(5) Push the AT head clockwise as far as it can go and fix it by finally tightening the two fixing screws.
(6) Connect the harness.


Connector
AT head assembly
When attaching the AT head to the shield case, push the AT head clockwise as far as it can go.
PS2 × 4
Shield case
AT head

2. Cleaning the AT head

(Refer to Section 4-2-5.)

Adjustments after Replacement

3. AT head zenith check and adjustment
(Refer to Section 5-6-3.)

4. Tape running check
(Refer to Section 6-2.)

5. Video tracking check
(Refer to Section 6-3.)

6. CTL head position check
(Refer to Section 6-4.)

7. AT head check and adjustment
(Refer to Section 6-7.)

8. Electrical adjustment after AT head replacement
(Refer to Section 7-3.)

9. Applying locking compound
(Refer to Section 6-1-9.)

5-6-2. AT Head Assembly Replacement

Overview

Replacement

1. Replacing the AT head assembly
2. Cleaning the AT head (Refer to Section 4-2-5.)

Adjustments after replacement

3. AT head zenith check and adjustment (Refer to Section 5-6-3.)
4. Tape running check (Refer to Section 6-2.)
5. Video tracking check (Refer to Section 6-3.)
6. CTL head position check (Refer to Section 6-4.)
7. AT head check and adjustment (Refer to Section 6-7.)
8. Electrical adjustment after AT head replacement (Refer to Section 7-3.)
9. Applying locking compound (Refer to Section 6-1-9.)

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) :	J-6325-400-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01
Nut driver :	7-700-751-02

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)

Removal/Installation Procedure

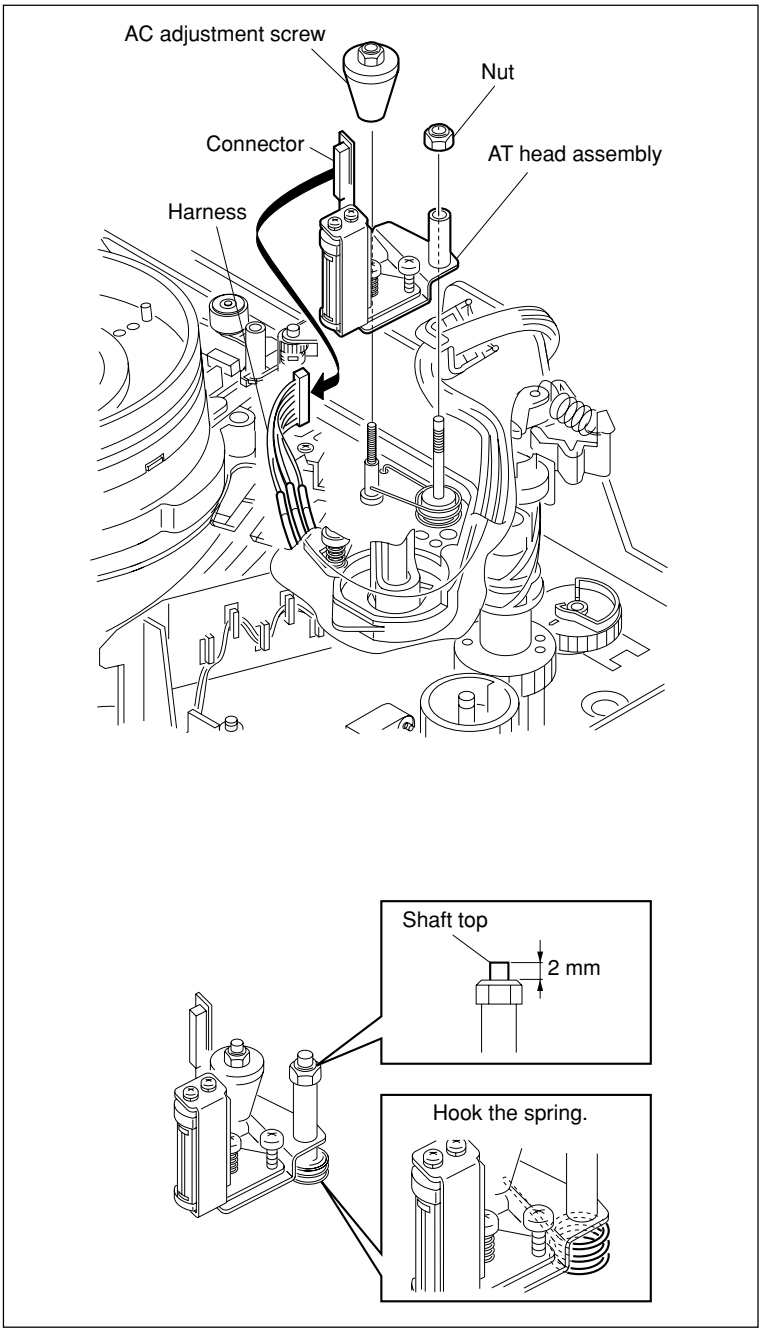
1. Replacing the AT head assembly

(1) Disconnect the harness from the connector of the AT head assembly.
(2) Remove the AC adjustment screw.
(3) Remove the nut and remove the AT head assembly.
(4) Install the new AT head assembly into the mounting shaft. Hook the spring on it and fix it with the nut.

Note

Tighten the nut up the position that is 2 mm from the shaft top.

(5) Connect the harness.
(6) Install the AC adjustment screw.



2. Cleaning the AT head

(Refer to Section 4-2-5.)

Adjustments after Replacement

3. AT head zenith check and adjustment
(Refer to Section 5-6-3.)

4. Tape running check
(Refer to Section 6-2.)

5. Video tracking check
(Refer to Section 6-3.)

6. CTL head position check
(Refer to Section 6-4.)

7. AT head check and adjustment
(Refer to Section 6-7.)

8. Electrical adjustment after AT head replacement
(Refer to Section 7-3.)

9. Applying locking compound
(Refer to Section 6-1-9.)

5-6-3. AT Head Zenith Check and Adjustment

Note

Perform the AT Head zenith check and adjustment only when the AT head is replaced or when the specification is not met in the AT Head Tape-to-head Contact Check (Section 6-7-3).
In all cases other than the above, this adjustment is not necessary.

Tools

- Cassette reference plate (L) : J-6320-880-A
- Perpendicularity check tool (VH-070) : J-6380-700-A (Master block)

Checking Procedure

1. Removing the cassette compartment assembly

If the cassette compartment assembly is already installed, remove it. (Refer to Section 1-5.)

2. Unthreading-end state

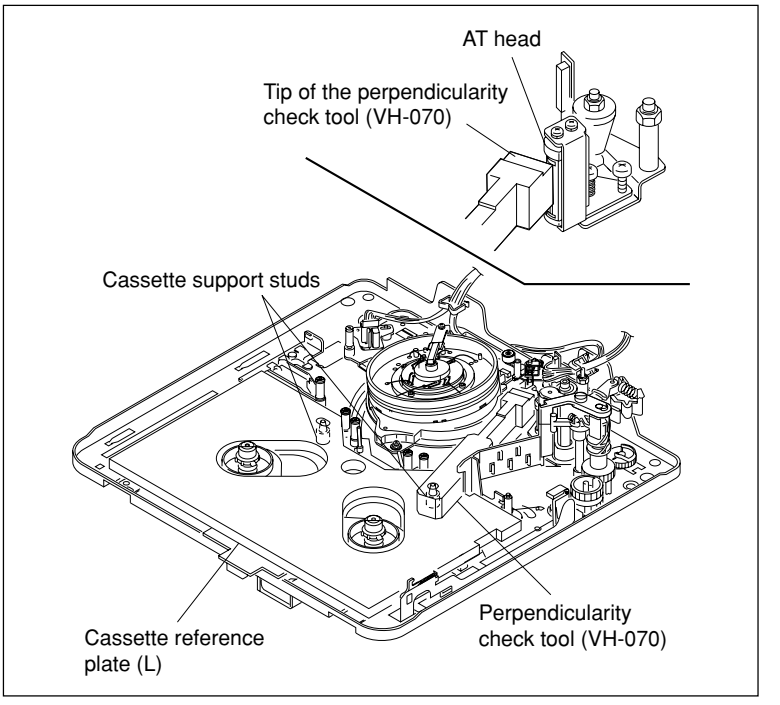
Check that the mechanical deck is in the unthreading-end state.

3. Checking zenith of the AT head

(1) Place the cassette reference plate (L) on the mechanism deck.
(2) Place the perpendicularity check tool (VH-070) on the cassette reference plate (L).
(3) Press lightly the tip of the perpendicularity check tool (VH-070) against the AT head.

Notes

- If the tip of the tool (VH-070) contacts the head drum, it may result in damage of the head drum. Perform the check and adjustment works deliberately with care not to contact the tip of the tool (VH-070) with the head drum.
- Press the tool (VH-070) strongly against the cassette reference plate (L) in order to perform the check and adjustment correctly.


AT head
Tip of the perpendicularity check tool (VH-070)
Cassette support studs
Cassette reference plate (L)
Perpendicularity check tool (VH-070)

(4) Check that there exists no clearance between the AT head and the tip of the perpendicularity check tool (VH-070) under the state of step (3).

If there is a clearance, perform step 4.
If there is no clearance, perform step 5.

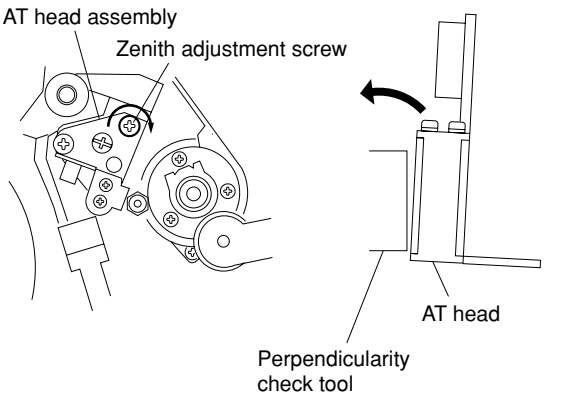
Adjustment Procedure

4. AT Head zenith adjustment

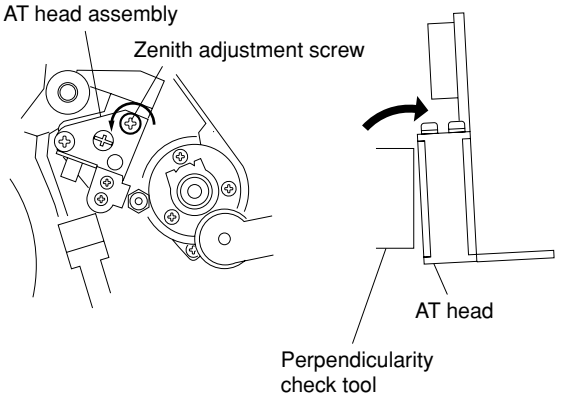
a. If there exists clearance in the top of the AT head (Fig. 1) :
Rotate the zenith adjustment screw clockwise for adjustment.

b. If there exists clearance in the lower part of the AT head (Fig. 2) :
Rotate the zenith adjustment screw counter-clockwise for adjustment.

[Fig. 1]



[Fig. 2]



5. Cleaning

Clean the surface of the AT head with the cleaning cloth moistened with the cleaning fluid.

5-7. Pinch Roller Replacement

If the pinch roller is damaged or wears out, replace the entire J pinch roller block assembly.

Overview

Replacement

1. Removing the tape top sensor assembly
2. Removing the J pinch roller block assembly
3. Coating the J pinch roller block assembly with grease
4. Installing the J pinch roller block assembly
5. Installing the tape top sensor assembly
6. Cleaning the pinch roller (Refer to Section 4-2-6.)

Adjustments after replacement

7. Tape running check (Refer to Section 6-2.)
8. Video tracking check (Refer to Section 6-3.)
9. CTL head position check (Refer to Section 6-4.)
10. AT head check (Refer to Section 6-7.)

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) :	J-6325-400-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Moly-coat grease (PG-622) :	7-651-000-59
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01

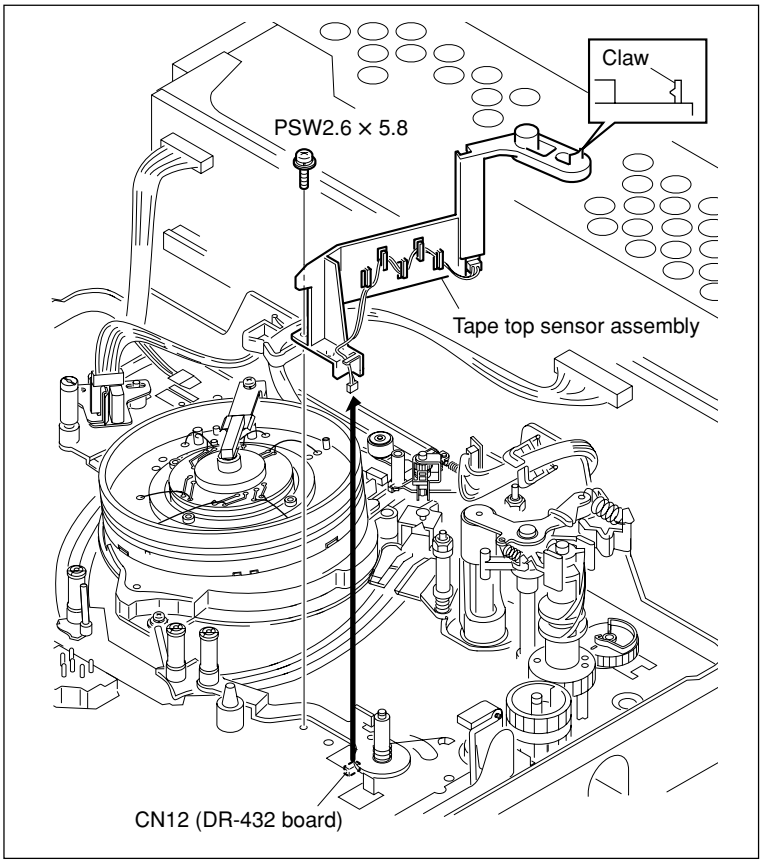
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Check that the mechanical deck is in the unthreading-end state. (Refer to Section 5-1-2.)

Removal Procedure

1. Removing the tape top sensor assembly

(1) Disconnect the harness from the connector (CN12) on the DR-432 board.
(2) Remove the screw.
(3) Unhook the claw and then remove the tape top sensor assembly.

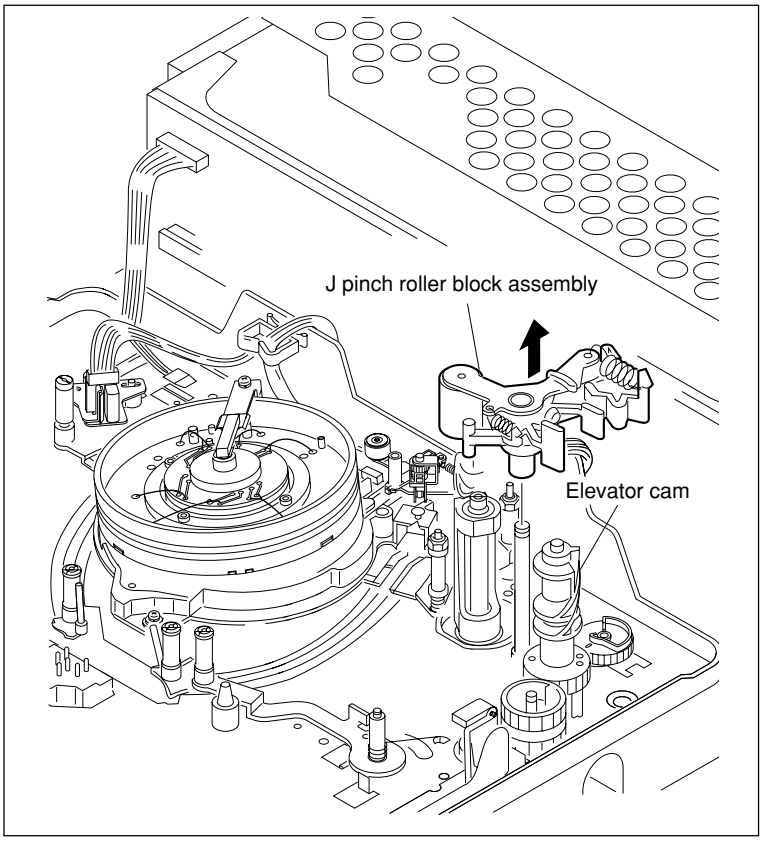


2. Removing the J pinch roller block assembly

Remove the J pinch roller block assembly in the direction of the arrow.

Note

When removing the J pinch roller block assembly, be careful that the elevator cam must not be dropped together in order to prevent occurrence of the phase error.
If the elevator cam is dropped, perform the phase adjustment. (Refer to Section 5-1-6.)



Installation Procedure

3. Coating the J pinch roller block assembly with grease

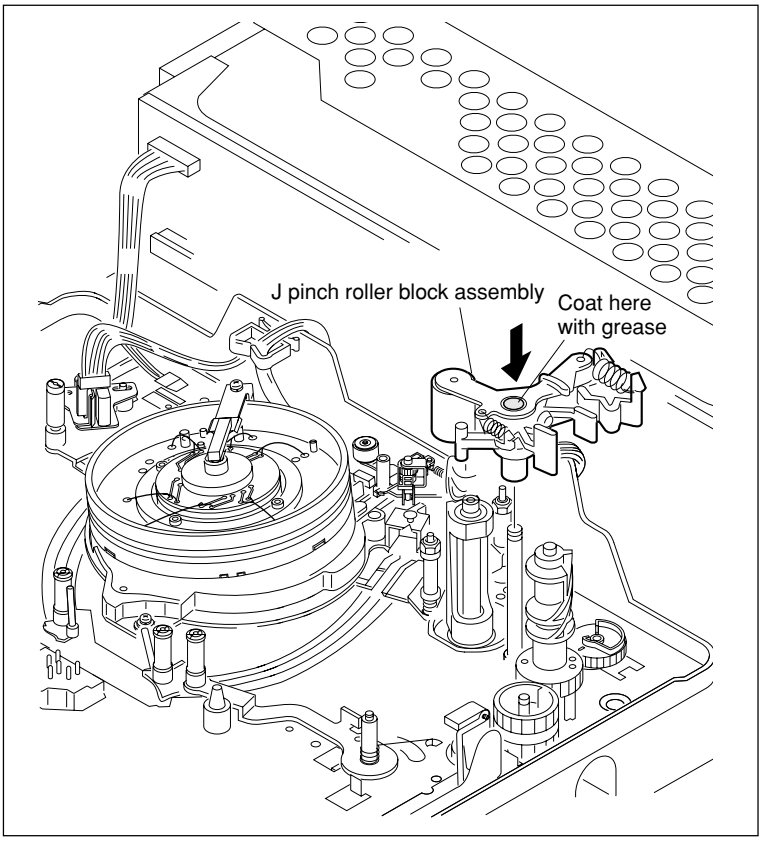
Coat inside (the area shown by the hatching ▭ in the illustration) the hole of the J pinch roller block assembly, thin with grease.

4. Installing the J pinch roller block assembly

Install the new J pinch roller block assembly to the mounting shaft.

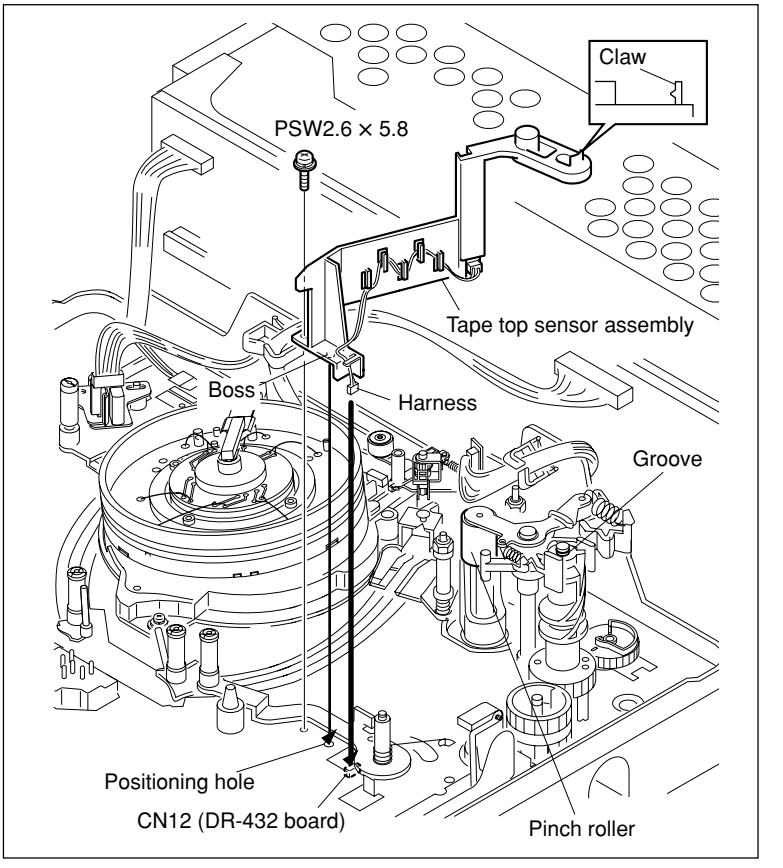
Note

Move the J pinch roller block assembly up and down, and wipe off the seeped grease.



5. Installing the tape top sensor assembly

(1) Align the boss of the tape top sensor assembly to the positioning hole, and fix it with screw. When doing so, check that the claw enter the groove of the shaft.
(2) Connect the harness to the connector (CN12) on the DR-432 board.



6. Cleaning the pinch roller

(Refer to Section 4-2-6.)

Adjustments after Replacement

7. Tape running check
(Refer to Section 6-2.)

8. Video tracking check
(Refer to Section 6-3.)

9. CTL head position check
(Refer to Section 6-4.)

10. AT head check
(Refer to Section 6-7.)

5-8. Capstan Motor Replacement

Overview

Replacement

1. Removing the DM-124 board (Refer to Section 5-23-2.)
2. Removing the capstan brake
3. Removing the capstan motor
4. Installing the capstan motor
5. Installing the capstan brake
6. Installing the DM-124 board (Refer to Section 5-23-2.)
7. Cleaning the capstan shaft and pinch roller (Refer to Section 4-2-6.)

Adjustments after replacement

8. Tape running check (Refer to Section 6-2.)
9. Video tracking check (Refer to Section 6-3.)
10. CTL head position check (Refer to Section 6-4.)
11. AT head check (Refer to Section 6-7.)
12. Servo system automatic adjustment (A00 : A01-A09 ADJUST)
    (Refer to Section 3-3-2.)

Tools

Torque screwdriver (0.6 N•m {6 kgf•cm}) :	J-6252-510-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the bottom plate assembly. (Refer to Section 1-4-2.)
3. Remove the top panel assembly. (Refer to Section 1-4-1.)

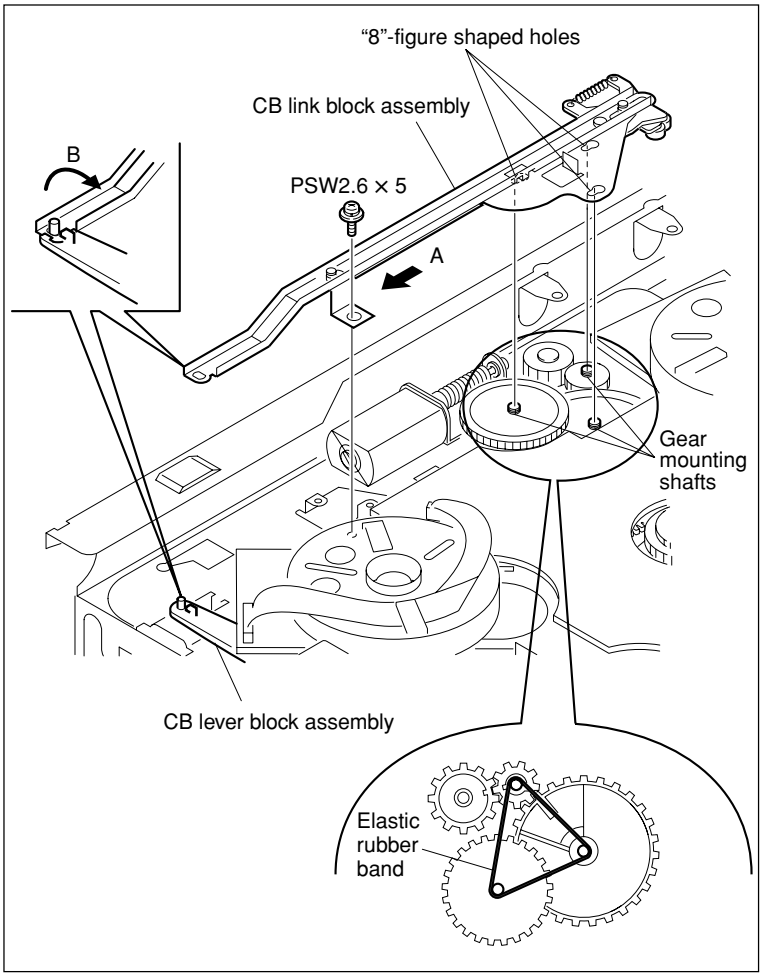
Removal Procedure

1. Removing the DM-124 board

(Refer to Section 5-23-2.)

2. Removing the capstan brake

(1) Remove the screw.
(2) Push the CB link block assembly in the direction of arrow A until it is disengaged from the three gear mounting shafts.
(3) Twist the CB link block assembly gently in the direction of arrow B until it is disengaged from the CB lever block assembly, and remove it.
(4) Fix the gears tentatively by hooking an elastic rubber band as shown.

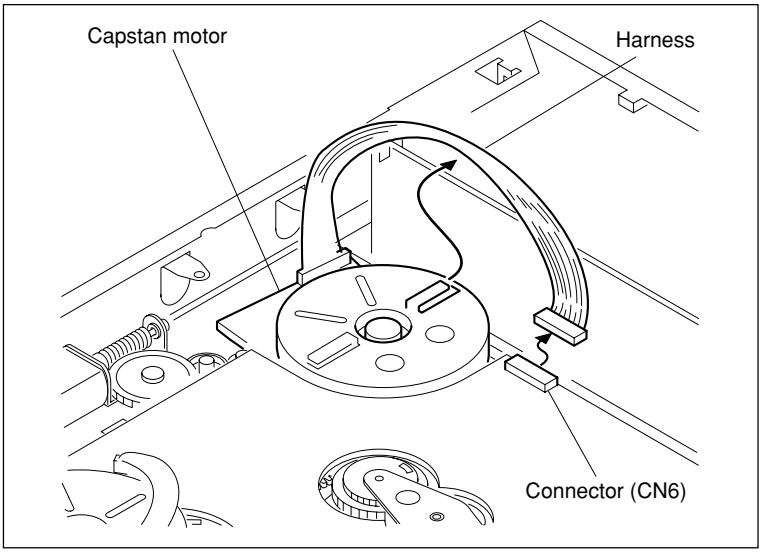


Note

If the CB link block assembly is left removed, the gear may drop off.
Fix the gears tentatively by hooking an elastic rubber band until installation of the CB link block assembly is completed.
If the gear drops off, perform the phase adjustment of the gear. (Refer to Section 5-1-6.)

3. Removing the capstan motor

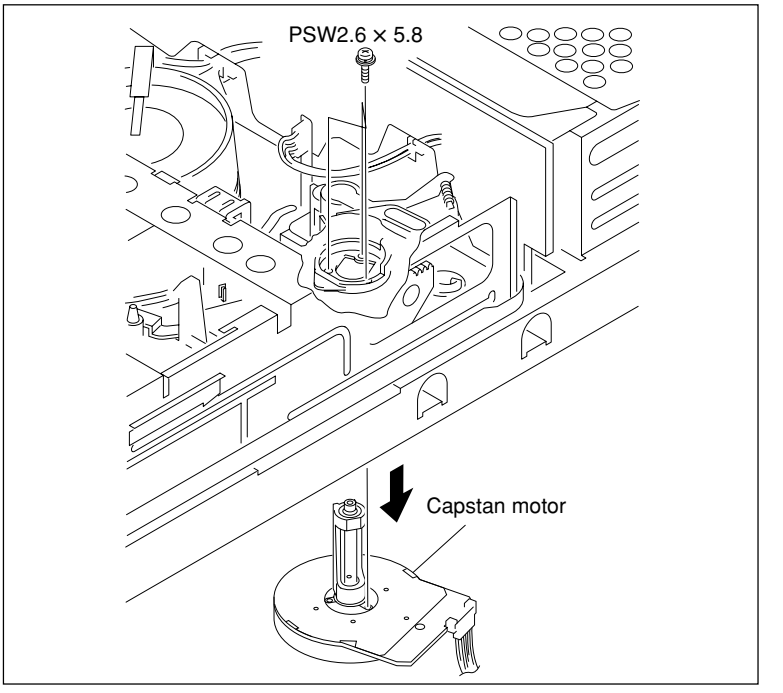
(1) Disconnect the harness of the capstan motor from the connector (CN6) on the DR-432 board.



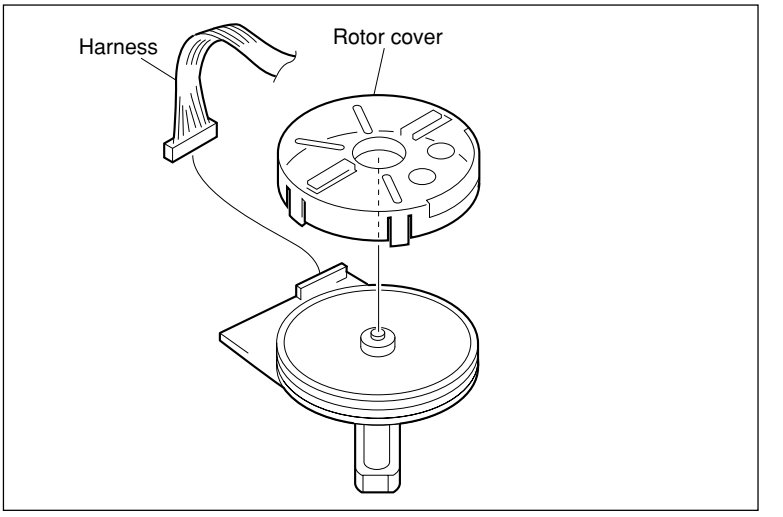
(2) While holding the capstan motor with hands, remove the three screws and remove the capstan motor.

Note

When doing so, be careful never contact the screwdriver against the pinch roller.



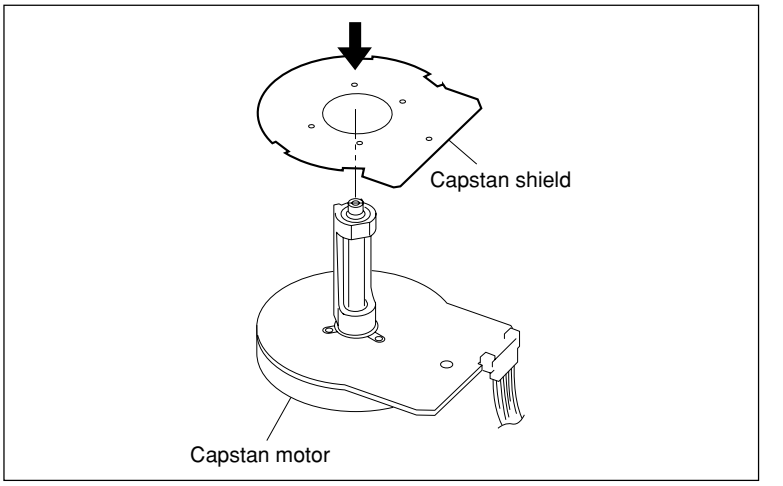
(3) Remove the rotor cover and disconnect the harness from the capstan motor that is removed in the previous step.



Installation Procedure

4. Installing the capstan motor

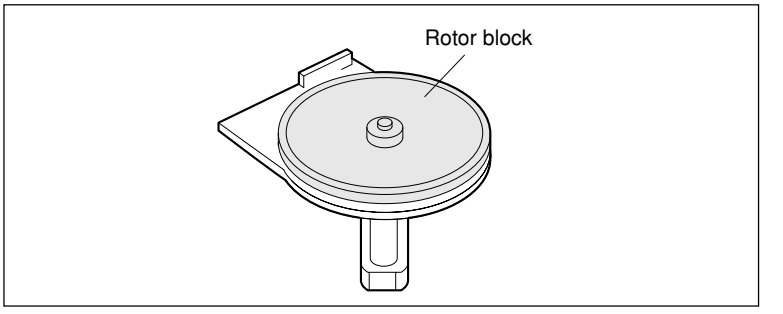
(1) Attach the capstan shield.



(2) Clean the rotor (area shown by the hatching ▭ in the illustration) of the motor with the cleaning cloth moistened with the cleaning fluid.

Note

Rotor of the motor attracts the metallic pieces easily.
If the rotor is used with the metallic pieces kept attracted, the motor may not work correctly.



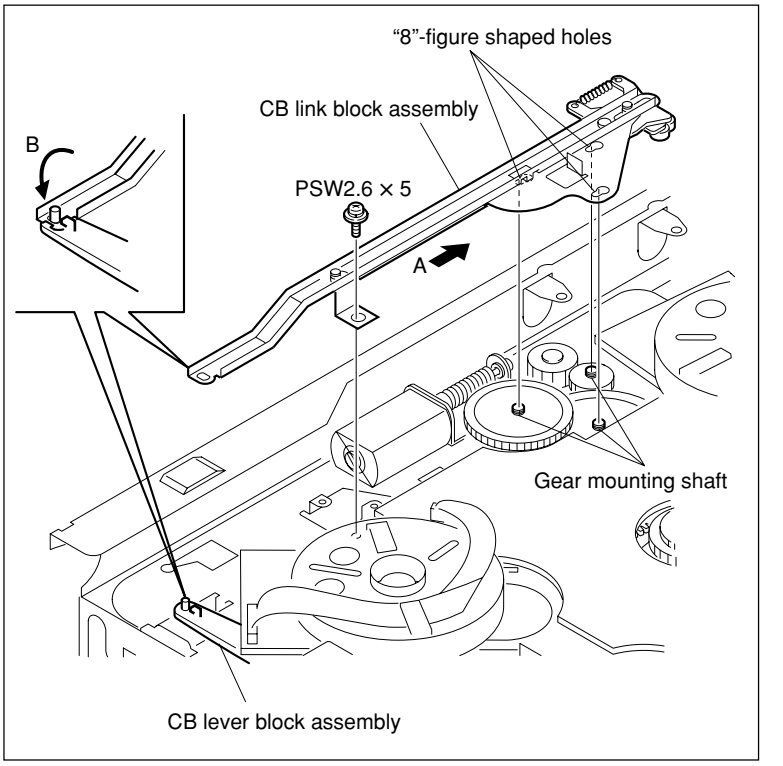
(3) Install the capstan motor by reversing the steps of removal.
Tightening torque : 50×10^{-2} N•m {5.1 kgf•cm}

Note

Connect the harness to the capstan motor first, then install the capstan motor the unit.
If the capstan motor is installed to the unit first then the harness is connected later, the capstan motor may be damaged due to the pressing force.

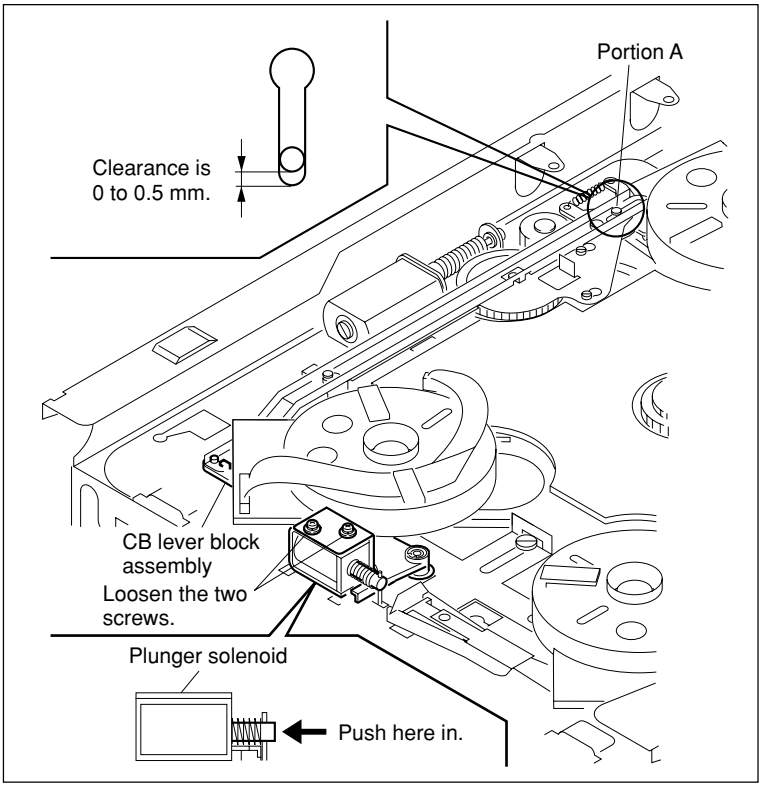
5. Installing the capstan brake

(1) Remove the elastic rubber band that is hooked to fix the gear tentatively.
(2) Install the CB link block assembly into the CB lever block assembly and to the three gear mounting shafts by coupling.
(3) Push the CB link block assembly in the direction of arrow A as far as it can go and fix it with the screws.



(4) While the iron core of the plunger solenoid is being pushed in, check that the clearance of the portion A meets the following specification.
Clearance = 0 to 0.5 mm

(5) If the specification does not meet, perform the following adjustment.
   a. Loosen the two screws that fix the CB lever block assembly to the plunger solenoid.
   b. While the iron core is being pushed in with fingers, adjust position of the CB lever block assembly until the clearance A meets the specification. Tighten the two screws while the specification is being met.
   c. Check the clearance of the portion A again. (Refer to step (3).)



6. Installing the DM-124 board
(Refer to Section 5-23-2.)

7. Cleaning the capstan shaft and pinch roller
(Refer to Section 4-2-6.)

Adjustments after Replacement

8. Tape running check
(Refer to Section 6-2.)

9. Video tracking check
(Refer to Section 6-3.)

10. CTL head position check
(Refer to Section 6-4.)

11. AT head check
(Refer to Section 6-7.)

12. Servo system automatic adjustment (A00 : A01-A09 ADJUST)
(Refer to Section 3-3-2.)

5-9. Reel Table Assembly Replacement

Overview

Replacement

1. Removing the reel table assembly
2. Installing the reel table assembly
3. Adjusting the reel table height

Note

The replacement procedure of the reel table assembly is the same for both the S-side and T-side reel table assemblies.

Tools

Cassette reference plate (L) (MW-088) :	J-6320-880-A
Reel table height gauge (NW-415) :	J-6324-150-A
L-shaped wrench (d = 1.27 mm) :	7-700-736-01

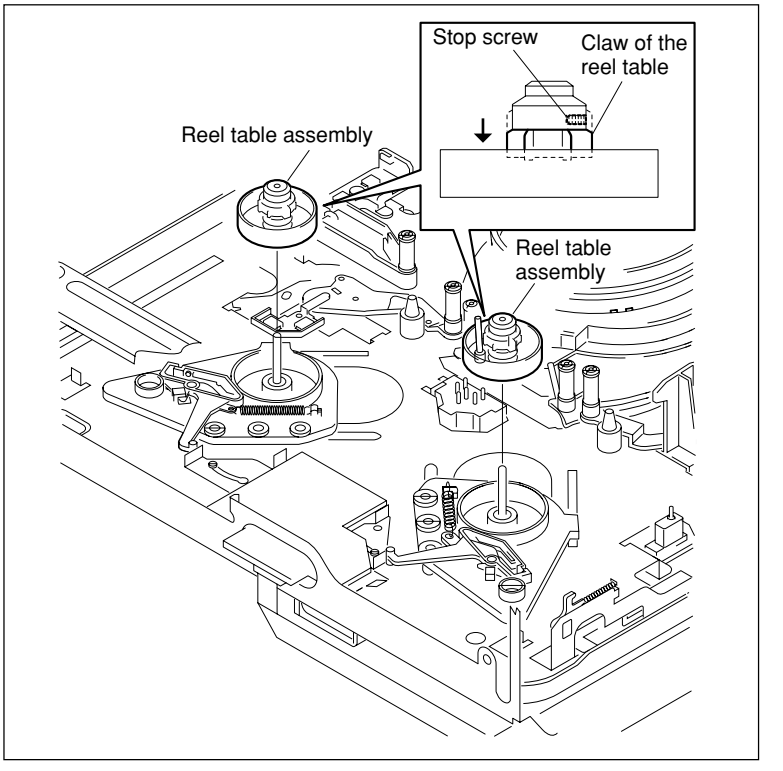
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)
4. Change the reel shift position to the L-cassette position. (Refer to Section 5-1-3.)

Removal Procedure

1. Removing the reel table assembly

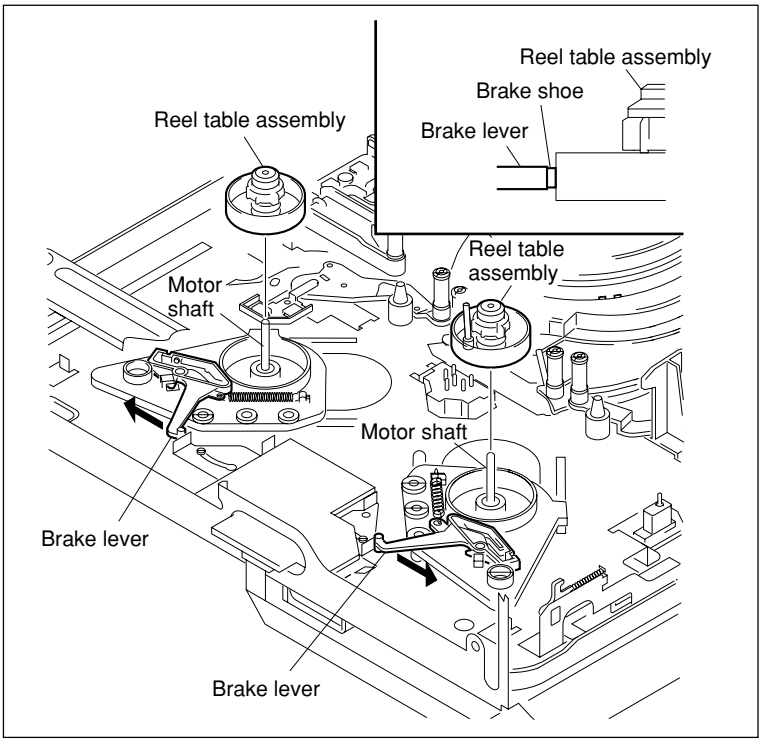
(1) Push down the claw of the reel table first. Then loosen the stop screw with an L-shaped wrench.
(2) Remove the reel table assembly straight up.



Installation Procedure

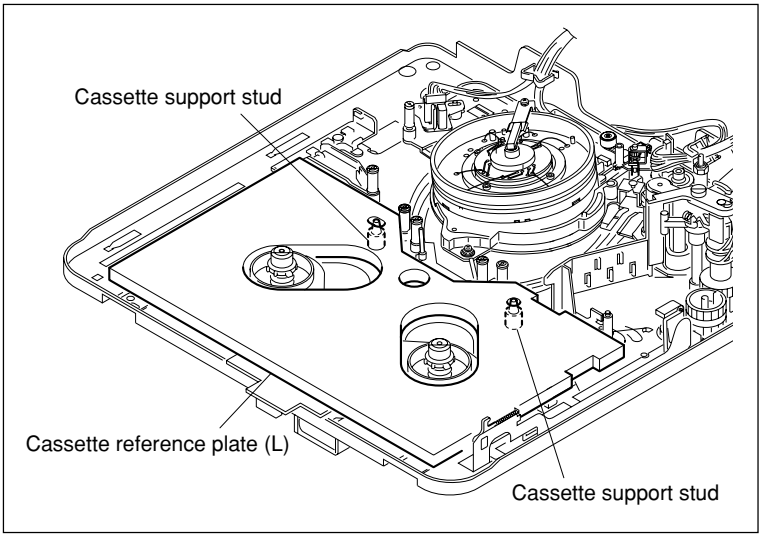
2. Installing the reel table assembly

(1) Open the brake lever in the direction of the arrow. With the brake lever opened, insert the new reel table assembly into the motor shaft.
(2) Push down the reel table claw first. Then loosen the reel table fixing screw lightly with an L-shaped wrench by 1/2 turn.
(3) Release the brake lever and check to see that the brake shoe contacts the reel table assembly. (The brake is engaged.)



3. Adjusting the reel table height

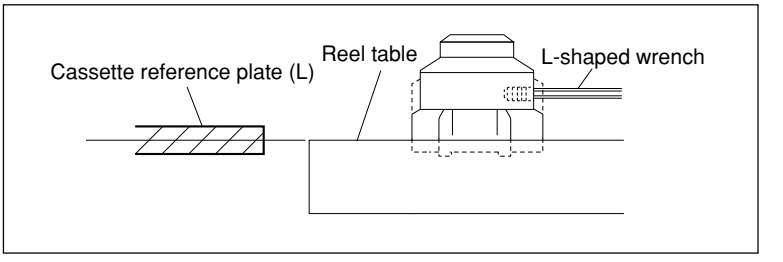
(1) Install the cassette reference plate (L) while aligning it to the cassette support studs (2 studs).



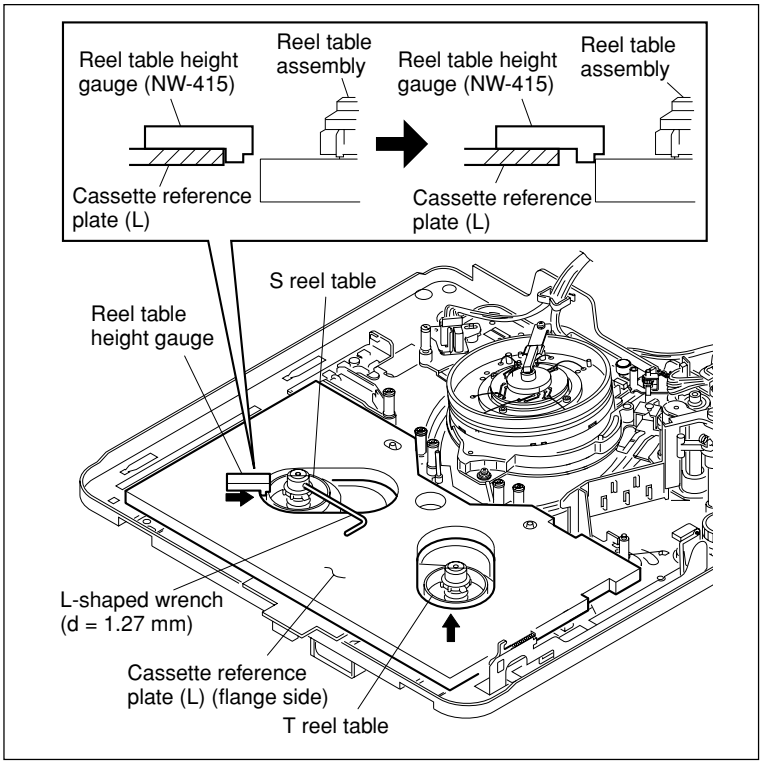
(2) Adjust the reel table height so that it is position in the center of the thickness of the cassette reference plate (L), and tighten tentatively the fixing screw with an L-shaped wrench.

Note

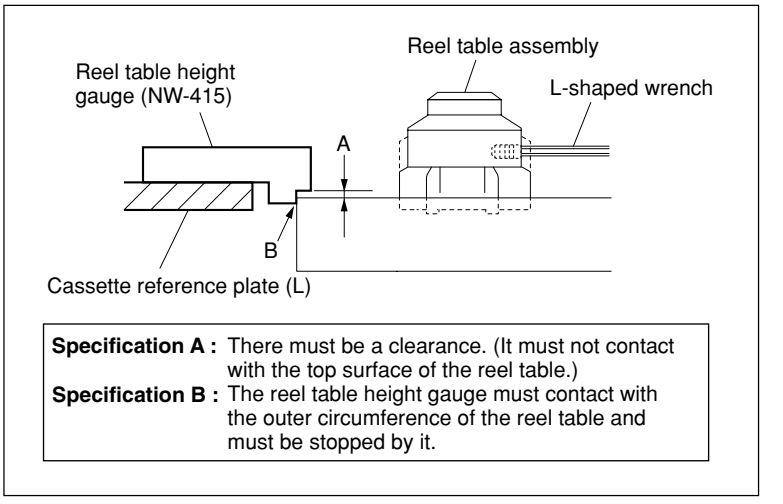
If the L-shaped wrench is left attached as shown in the illustration, it facilitates the tightening work.



(3) Install the reel table height gauge to the position shown by the arrow of the S reel side (or to the T reel side) as shown in the illustration.


Reel table height gauge (NW-415)
Reel table assembly
Cassette reference plate (L)
Reel table height gauge (NW-415)
Reel table assembly
Cassette reference plate (L)
S reel table
Reel table height gauge
L-shaped wrench (d = 1.27 mm)
Cassette reference plate (L) (flange side)
T reel table

(4) Check to see that the reel table height meets specification when the reel table height gauge is slidden in the direction toward center of the reel table.
If the reel table height meets specification, adjust the reel table height and check again.
- If the reel table height does not meet the specification A, lower the reel table height a little.
- If the reel table height does not meet the specification B, raise the reel table height a little.



Specification A : There must be a clearance. (It must not contact with the top surface of the reel table.)
Specification B : The reel table height gauge must contact with the outer circumference of the reel table and must be stopped by it.

(5) Remove the cassette reference plate (L) and tighten the stop screw that is tentatively fastened in step (2).

5-10. Brake Lever Assembly Replacement

If the brake shoe wears out, replace the entire brake lever assembly.

Overview

Replacement

1. Removing the brake lever assembly
2. Installing the brake lever assembly

Note

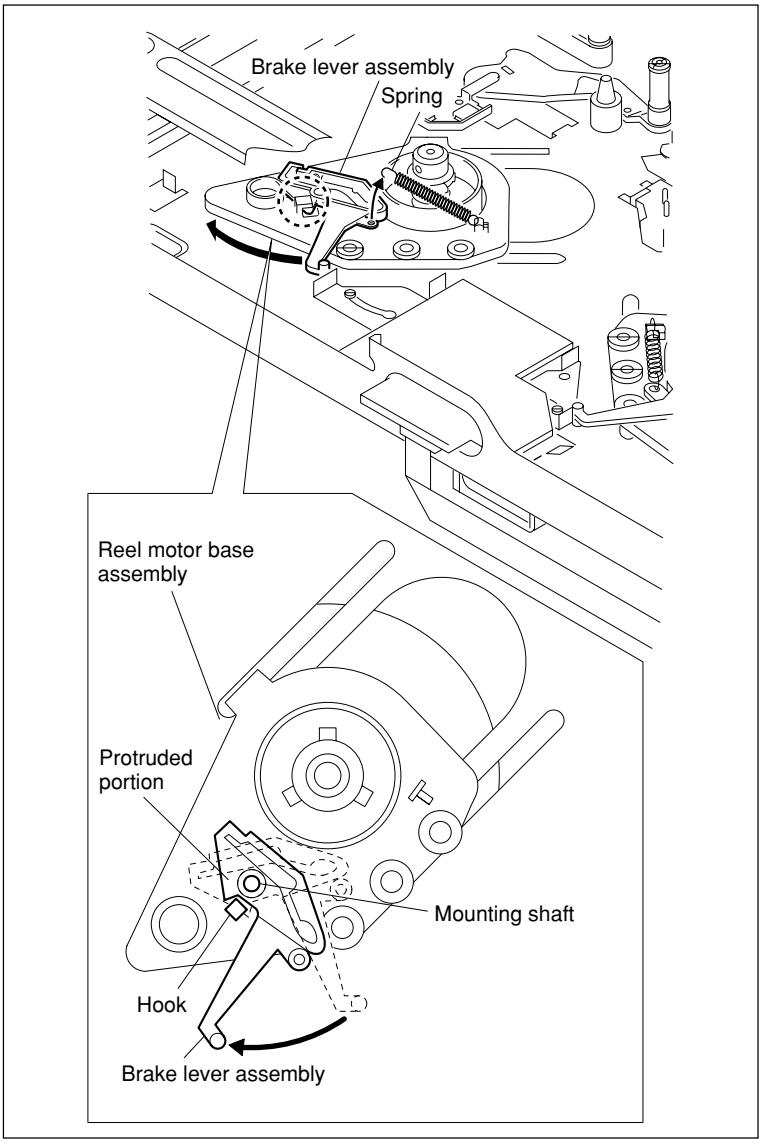
The replacement procedure of the brake lever assembly is the same for both the S-side and T-side brake lever assemblies.

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)

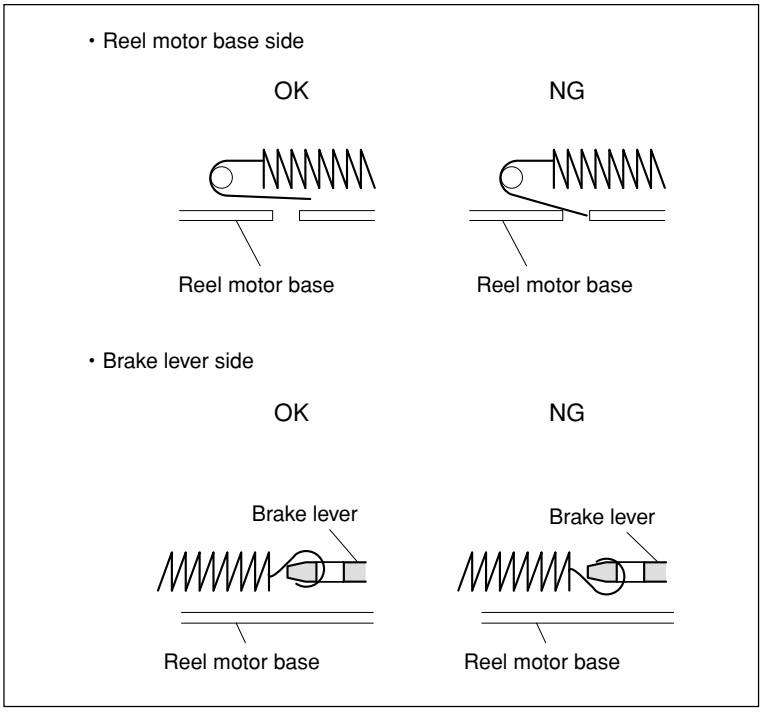
Removal Procedure

1. Remove the spring from the brake lever assembly.
2. Turn the brake lever assembly in the direction of the arrow to release the protruded portion of the brake lever assembly from the hook of the reel motor base assembly. Then remove the brake lever assembly from the mounting shaft.



Installation Procedure

3. Install the new brake lever assembly by reversing the steps of removal.
4. After replacement is complete, check the installation condition of the spring.



5-11. Reel Motor Replacement

Overview

Replacement

1. Removing the DM-124 board (Refer to Section 5-23-2.)
2. Removing the reel table assembly (Refer to Section 5-9.)
3. Removing the reel motor
4. Installing the reel motor
5. Installing the reel table assembly (Refer to Section 5-9.)
6. Installing the DM-124 board (Refer to Section 5-23-2.)

Adjustments after replacement

7. Tape running check (Refer to Section 6-2.)
8. Video tracking check (Refer to Section 6-3.)
9. CTL head position check (Refer to Section 6-4.)
10. AT head check (Refer to Section 6-7.)
11. Servo system automatic adjustment (A00 : A01-A09 ADJUST)
    (Refer to Section 3-3-2.)

Note

The replacement procedure of the reel motor is the same for both the S-side and T-side reel motors.

Tools

Torque screwdriver (0.6 N•m {6 kgf•cm}) :	J-6252-510-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Grease (SGL-601) :	7-651-000-10
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the bottom plate assembly. (Refer to Section 1-4-2.)
4. Remove the cassette compartment assembly. (Refer to Section 1-5.)

Removal Procedure

1. Removing the DM-124 board

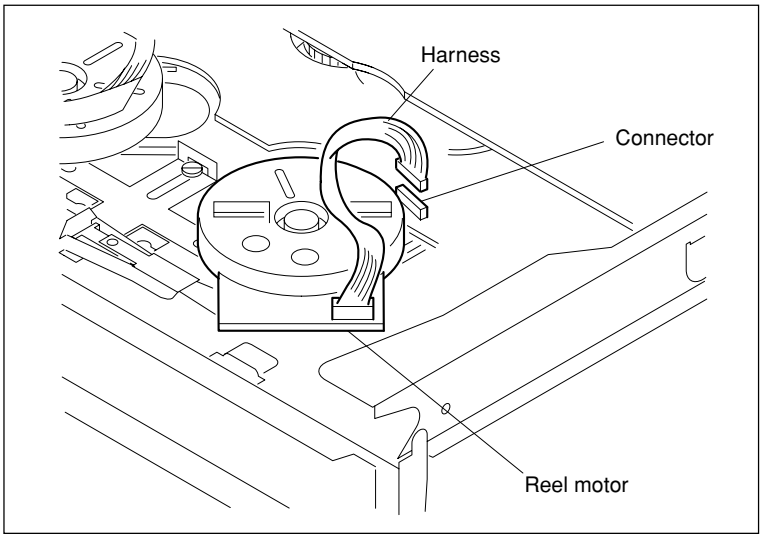
(Refer to Section 5-23-2.)

2. Removing the reel table assembly

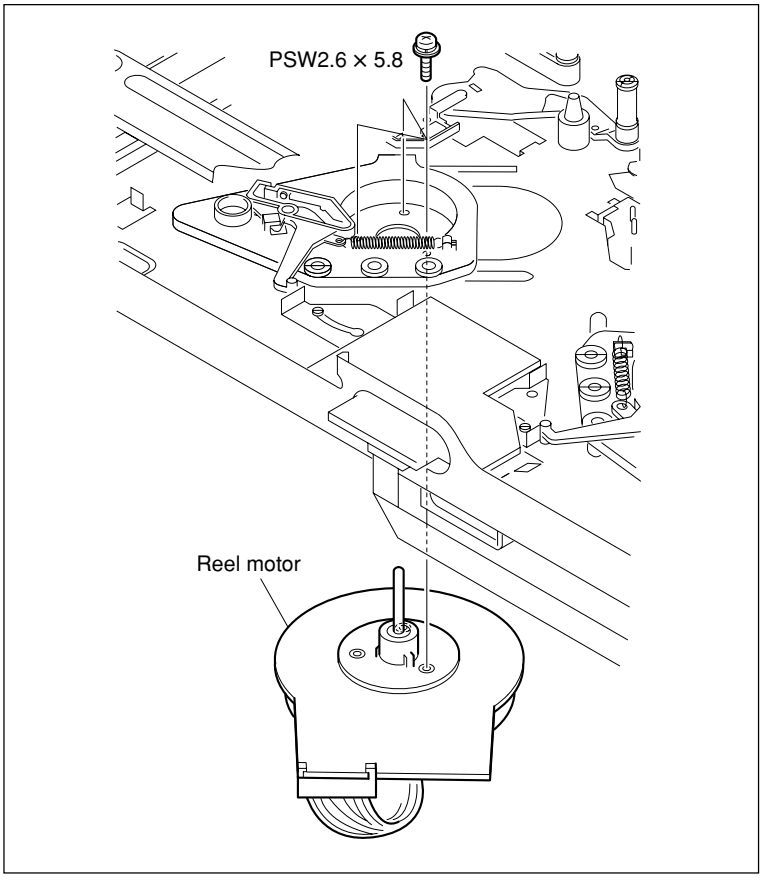
(Refer to Section 5-9.)

3. Removing the reel motor

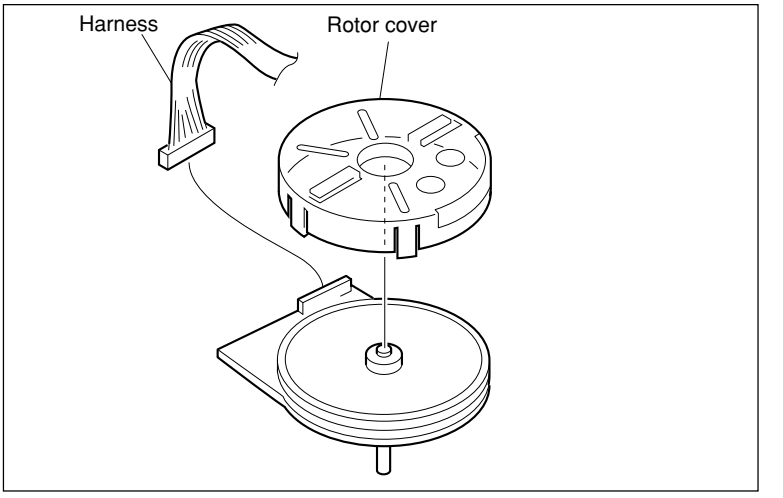
(1) Disconnect the harness of the reel motor from the connector (T-reel side: CN3, S-reel side: CN4) on the DR-432 board.



(2) While holding the reel motor with hands, remove the three screws and remove the reel motor.



(3) Remove the rotor cover and disconnect the harness from the reel motor that is removed in the previous step.



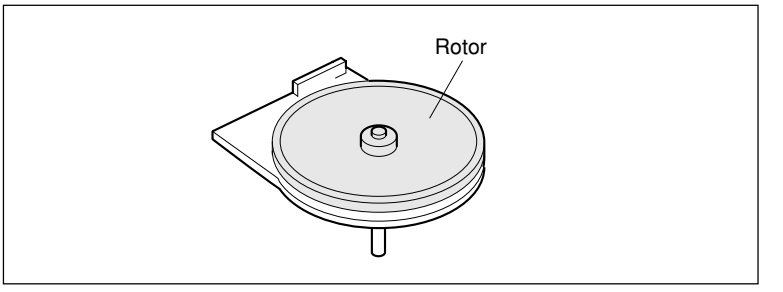
Installation Procedure

4. Installing the reel motor

(1) Clean the rotor (area shown by the hatching ▭ in the illustration) of the motor with the cleaning cloth moistened with the cleaning fluid.

Note

Rotor of the motor attracts the metallic pieces easily.
If the rotor is used with the metallic pieces kept attracted, the motor may not work correctly.



(2) Install the reel motor by reversing the steps of removal.
Tightening torque : 50×10^{-2} N•m {5.1 kgf•cm}

Notes

- Connect the harness to the reel motor first, then install the reel motor to the unit.
  If the reel motor is installed to the unit first then the harness is connected later, the reel motor may be damaged due to the pressing force.
- When the reel motors of the S-side and the T-side are replaced at the same time, do not use the S-side harness in the T-side or vice versa by mistake.
  The bending condition of the harnesses is different.

5. Installing the reel table assembly

(Refer to Section 5-9.)

6. Installing the DM-124 board

(Refer to Section 5-23-2.)

Adjustments after Replacement

7. Tape running check
(Refer to Section 6-2.)

8. Video tracking check
(Refer to Section 6-3.)

9. CTL head position check
(Refer to Section 6-4.)

10. AT head check
(Refer to Section 6-7.)

11. Servo system automatic adjustment (A00 : A01-A09 ADJUST)
(Refer to Section 3-3-2.)

5-12. Tape Cleaner Assembly Replacement

CAUTION

Never touch the cleaning blade of the tape cleaner assembly with bare hands. The cleaning blade of the tape cleaner assembly is very sharp and it can cut your hands. Be very careful when replacing or adjusting the peripheral parts.

Overview

Replacement

1. Replacing the tape cleaner assembly
2. Cleaning the cleaning blade (Refer to Section 4-2-5.)

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) : J-6325-400-A
Torque screwdriver's bit (for M2) : J-6325-380-A

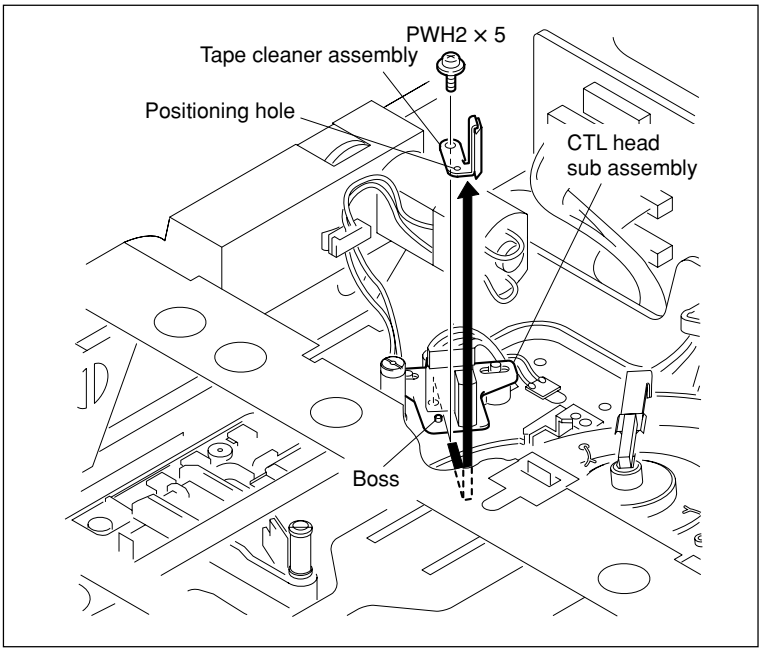
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)

Removal/Installation Procedure

1. Replacing the tape cleaner assembly

(1) Remove the screw and remove the tape cleaner assembly in the direction of the arrow from the CTL head sub assembly.
(2) Align the positioning hole of the new tape cleaner assembly with the boss, then fix it with screw.



2. Cleaning the cleaning blade

(Refer to Section 4-2-5.)

5-13. S-TEN Arm Assembly Replacement

5-13-1. S-TEN Arm Assembly Replacement

Overview

Replacement

1. Removing the S-TEN arm assembly
2. Installing the S-TEN arm assembly
3. Cleaning the S4 tape guide (Refer to Section 4-2-6.)

Adjustments after replacement

4. Tension regulator adjustment (Refer to Section 5-13-2.)
5. Tape running check (Refer to Section 6-2.)
6. Video tracking check (Refer to Section 6-3.)
7. CTL head position check (Refer to Section 6-4.)
8. AT head check (Refer to Section 6-7.)

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm} :	J-6325-400-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01
Oil (NT-68) :	7-661-018-18

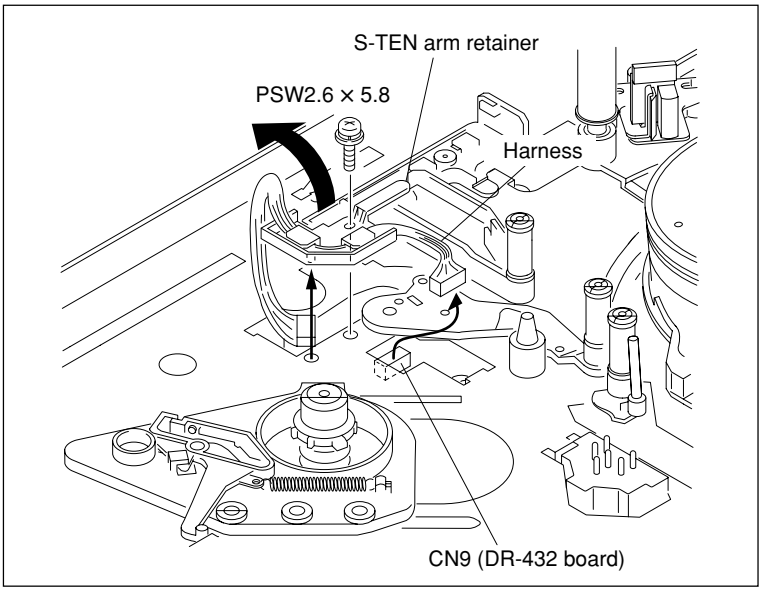
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)
4. Set the mechanical deck to the unthreading-end state. (Refer to Section 5-1-2.)

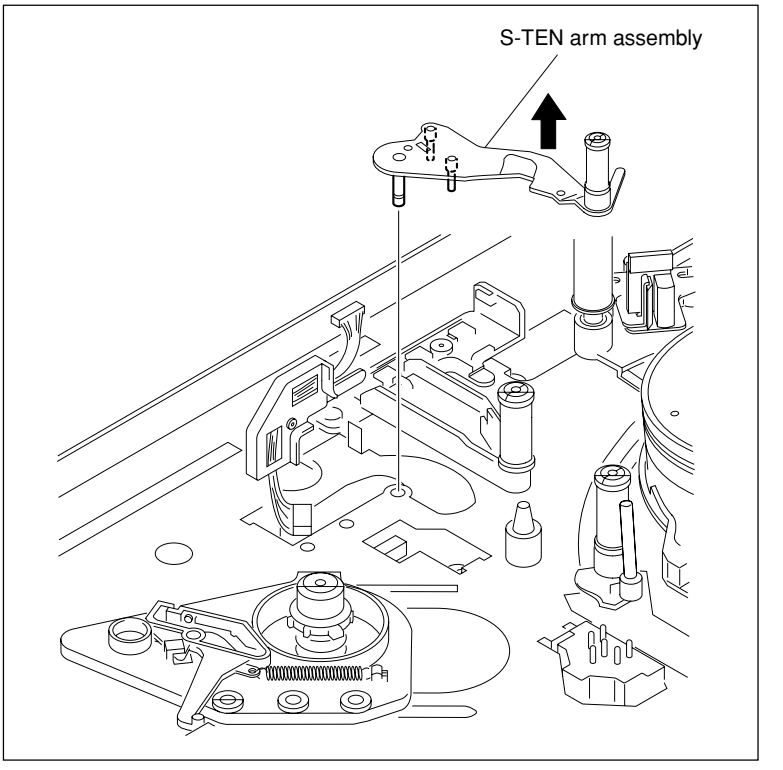
Removal Procedure

1. Removing the S-TEN arm assembly

(1) Disconnect the harness from the connector (CN9) on the DR-432 board.
(2) Remove the screw.
(3) Move the S-TEN arm retainer to the position so that the S-TEN arm assembly can be removed.



(4) Remove the S-TEN arm assembly in the direction of the arrow.



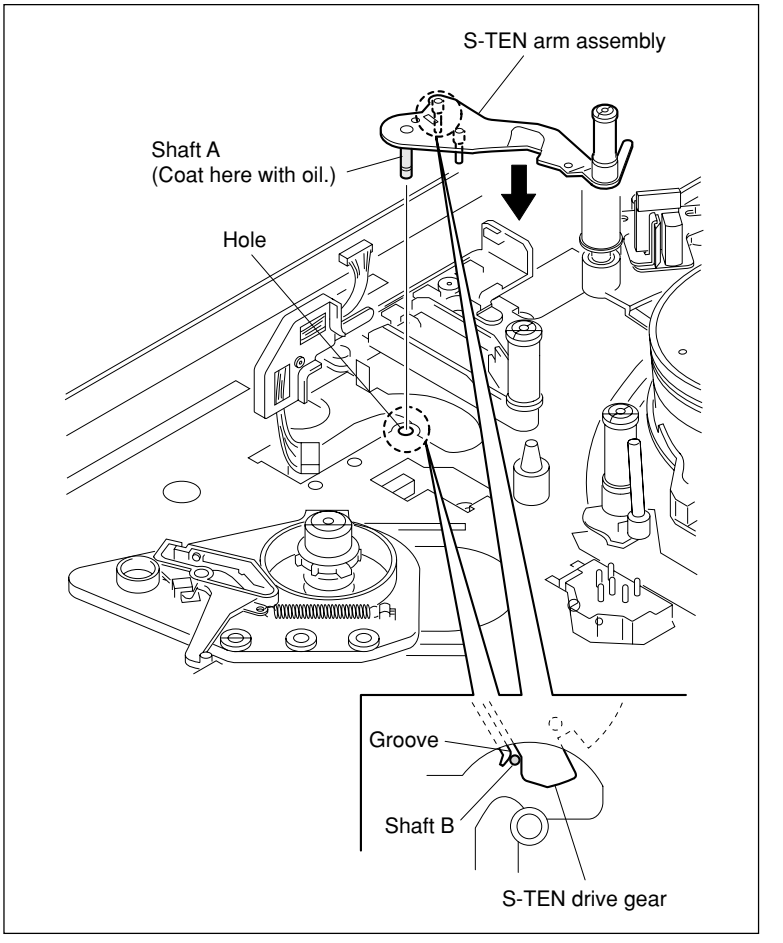
Installation Procedure

2. Installing the S-TEN arm assembly

(1) Coat the shaft A (the area shown by the shading ▭ in the illustration) of the new S-TEN arm assembly with oil. Then install it into the hole.

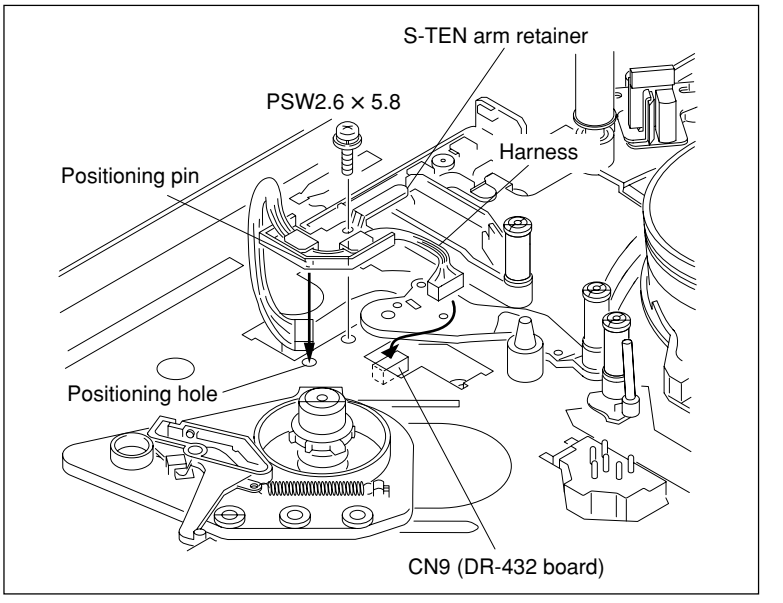
Note

Check that the shaft B of the S-TEN arm has entered the groove of the S-TEN drive gear.



(2) Align the positioning pin of the S-TEN arm retainer to the positioning hole, and fix it with the screw.
Tightening torque : 20×10^{-2} N•m {2.0 kgf•cm}

(3) Connect the harness to the connector (CN9) on the DR-432 board.



3. Cleaning the S4 tape guide

(Refer to Section 4-2-6.)

Adjustments after Replacement

4. Tension regulator adjustment
(Refer to Section 5-13-2.)

5. Tape running check
(Refer to Section 6-2.)

6. Video tracking check
(Refer to Section 6-3.)

7. CTL head position check
(Refer to Section 6-4.)

8. AT head check
(Refer to Section 6-7.)

5-13-2. Tension Regulator Adjustment

Tools

- Tension adjustment weight (weight 76.7 gf) : J-7031-040-A
- Tension adjustment weight (weight 44 gf) : J-7031-050-A

Note

Perform this adjustment when the S-TEN arm assembly or the relay gear holder or the relay gear or the S-TEN drive gear is replaced or removed/installed.

Adjustment Procedure

1. Removing the top panel assembly

If the top panel assembly is already installed, remove it.
(Refer to Section 1-4-1.)

2. Setting the maintenance mode

(1) Turn on the main power.
(2) Start up the maintenance mode.
(3) Enter A51 : TENSION REGULATOR.
Maintenance mode → M1 : ADJUST MODE → A5 : MECHANISM ADJUST → A51 : TENSION REGULATOR

Note

The tension value or the ADC value appears on the time data display area.
The tension value/ADC values can be switched by rotating the JOG dial (or SHUTTLE ring).

3. Tension offset adjustment

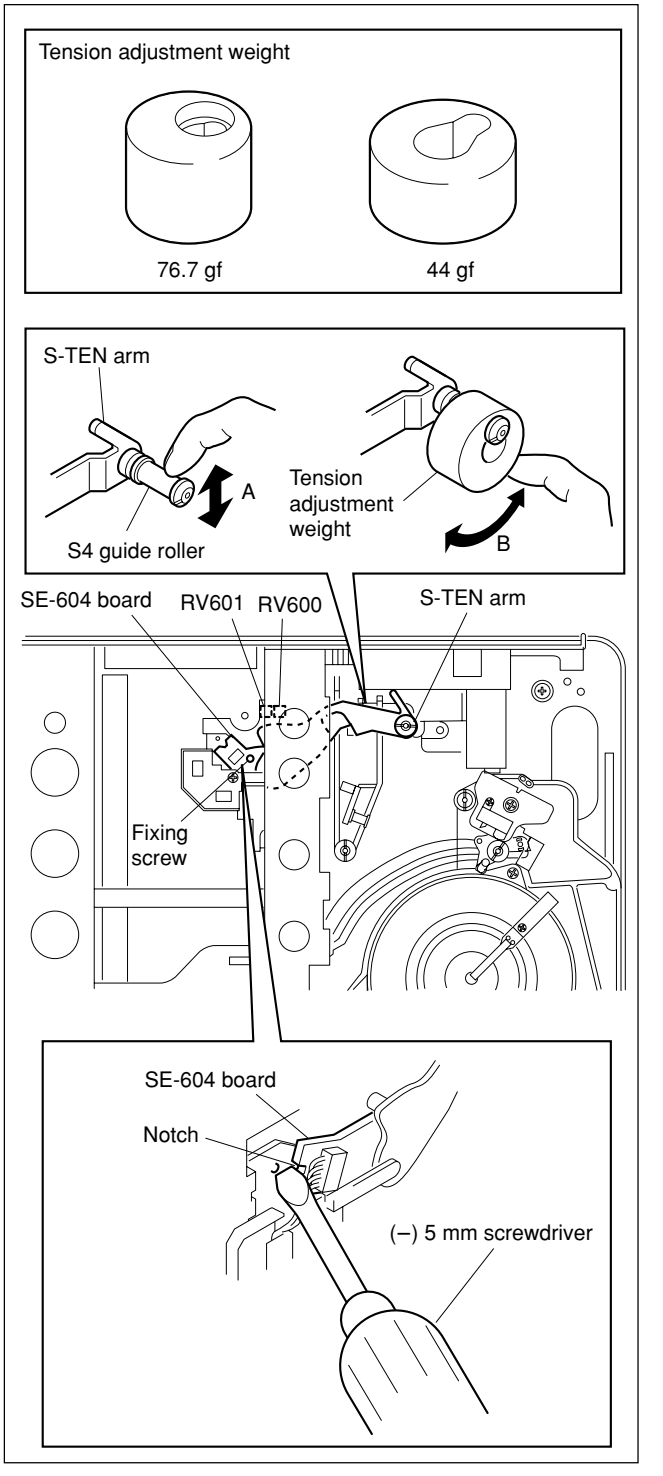
(1) Adjust RV600 on the DR-432 board until the ADC value in the time data display area meets the specification.
Specification : 200 ±8
(2) Press the SET button to complete threading.
(3) Lay down the unit so that the right side of the unit faces down.
(4) Press the guide roller shaft of the S-TEN arm 10 times with fingertip in the direction of arrow A.
(5) Hook the tension adjustment weight (weight 44 gf) on the S4 guide roller gently.
(6) Touch the tension adjustment weight lightly in order to swing it as a pendulum in the direction of the arrow B.
(7) Loosen the fixing screw of the SE-604 board by 1/4 to 1/2 turn. Adjust the position of the SE-604 board until the ADC value meets the specification by inserting the (−) 5 mm screwdriver tip into the notch and move it.
Specification : 200 ±8
(8) Fasten the screw that is loosened in step (7) and fix the SE-604 board tentatively.
(9) Remove the tension adjustment weight (weight 44 gf) from the S4 guide roller gently.

4. Tension gain adjustment

(1) Hook the tension adjustment weight (weight 76.7 gf) on the S4 guide roller gently.
(2) Touch the tension adjustment weight lightly in order to swing it as a pendulum.
(3) Adjust RV601 on the DR-432 board until the ADC value meets the specification.
Specification : 2B6 ±8
(4) Rotate the JOG dial to show the tension value on the time data display area.
(5) Change the tension adjustment weight (from weight 76.7 gf to weight 44 gf) gently.
(6) Touch the tension adjustment weight lightly in order to swing it as a pendulum.
(7) Loosen the fixing screw of the SE-604 board. Adjust the position of the SE-604 board until the ADC value meets the specification by inserting the (−) 5 mm screwdriver tip into the notch and move it.
Specification : 27.7 ±1.0
(8) Fasten the screw securing the SE-604 board.
Tightening torque : 40×10^{-2} N•m {4.0 kgf•cm}
(9) Remove the tension adjustment weight (weight 44 gf) from the S4 guide roller gently.
(10) Press the SET button to complete unthreading.

Note

Then tension value changes with the temperature. Perform steps 3 and 4 consecutively.
If the adjustment is interrupted in its middle, repeat the adjustment starting from step 3 all over again.



5. Cleaning the S4 tape guide

(Refer to Section 4-2-6.)

5-14. Cassette Compartment Motor Replacement

When the cassette compartment motor needs to be replaced, replace the entire C motor sub assembly.

Overview

Replacement

1. Removing the C motor holder block assembly
2. Removing the C motor sub assembly
3. Installing the C motor sub assembly
4. Coating the mounting shafts with oil
5. Installing the deceleration gears
6. Installing the C motor holder block assembly
7. Checking operations

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) :	J-6325-400-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Oil (NT-68) :	7-661-018-18

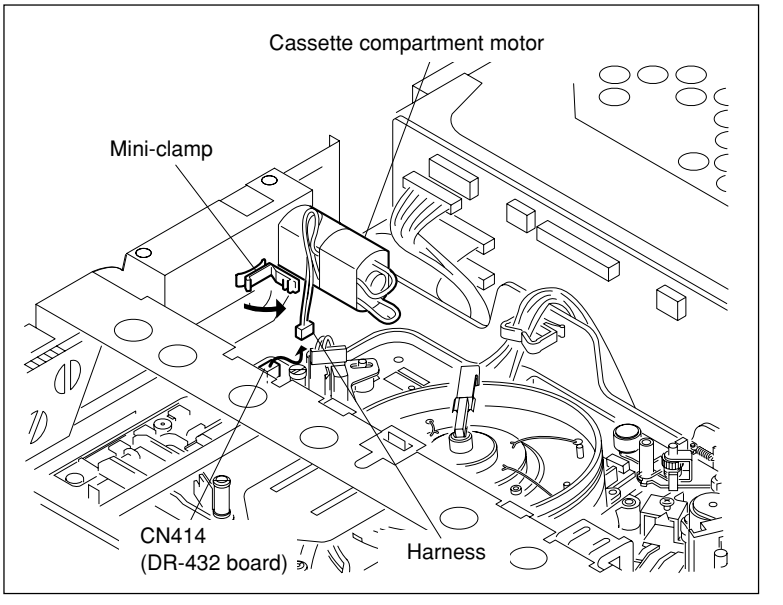
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)

Removal Procedure

1. Removing the C motor holder block assembly

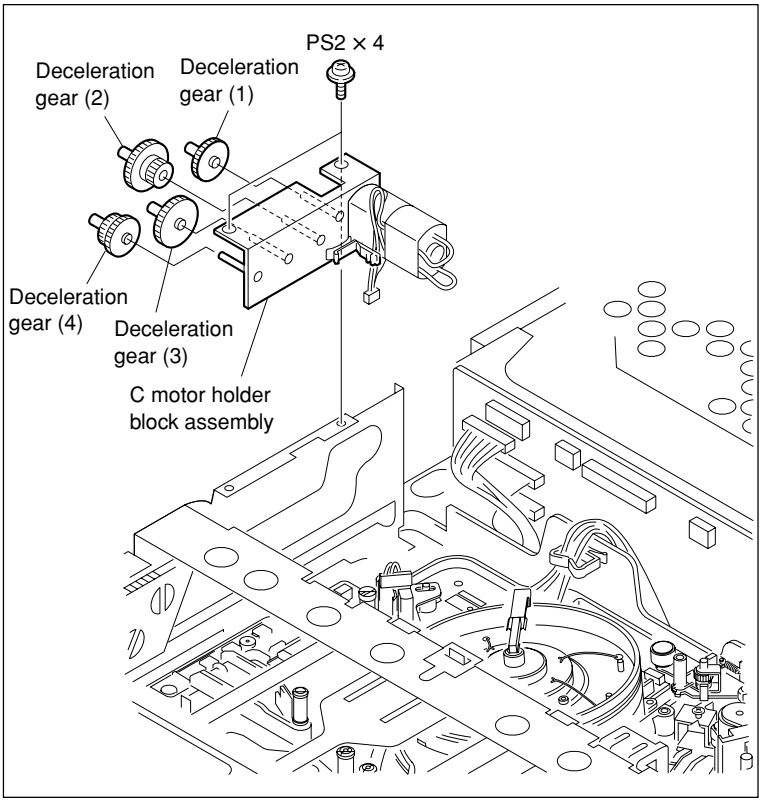
(1) Open the mini-clamp and release the harness.
(2) Disconnect the harness from the connector (CN414) on the DR-432 board.



(3) Remove the two screws and remove the C motor holder block assembly.
(4) Remove the deceleration gears (1), (2), (3), and (4).

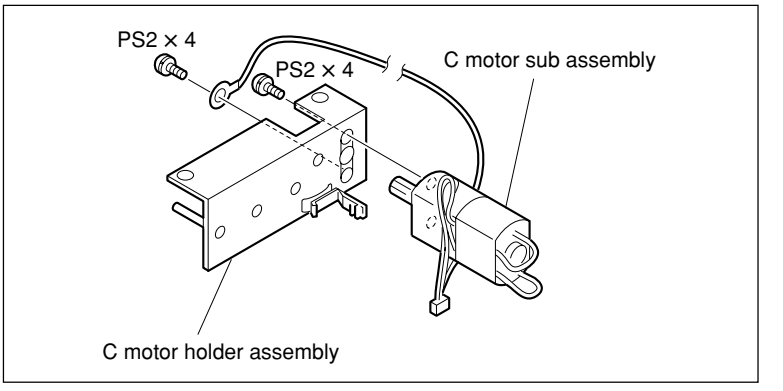
Note

These deceleration gears are not fixed. Be careful not to lose any of them.



2. Removing the C motor sub assembly

Remove the two screws and remove the C motor sub assembly from the C motor holder assembly.



Installation Procedure

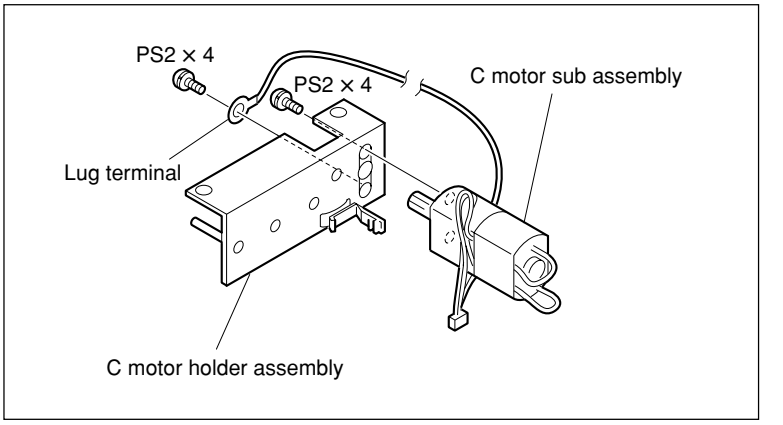
3. Installing the C motor sub assembly

Install the new C motor sub assembly to the C motor holder assembly with the two screws.

Note

Do not forget to attach the lug terminal.

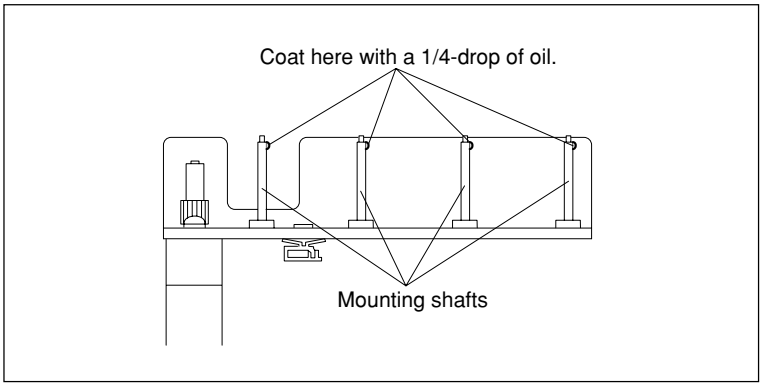
Tightening torque : 19×10^{-2} N•m {1.9 kgf•cm}



4. Coating the mounting shafts with oil

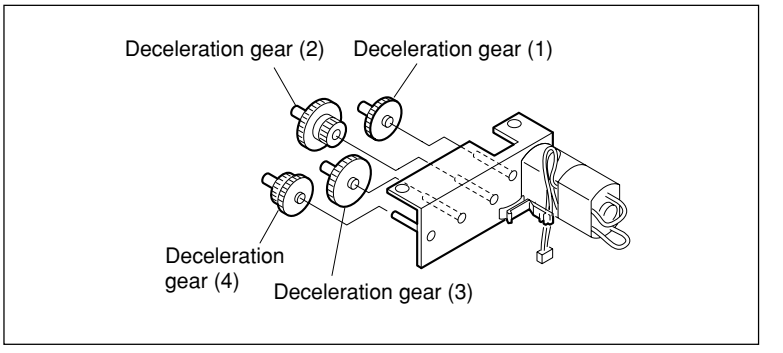
(1) Wipe the four deceleration gear mounting shafts with a dry cleaning cloth first.

(2) Coat the underneath of the steps of the four deceleration gear mounting shafts with a 1/4-drop of oil.



5. Installing the deceleration gears

Install the four deceleration gears (1), (3), (2), and (4) to the gear mounting shafts in this order.



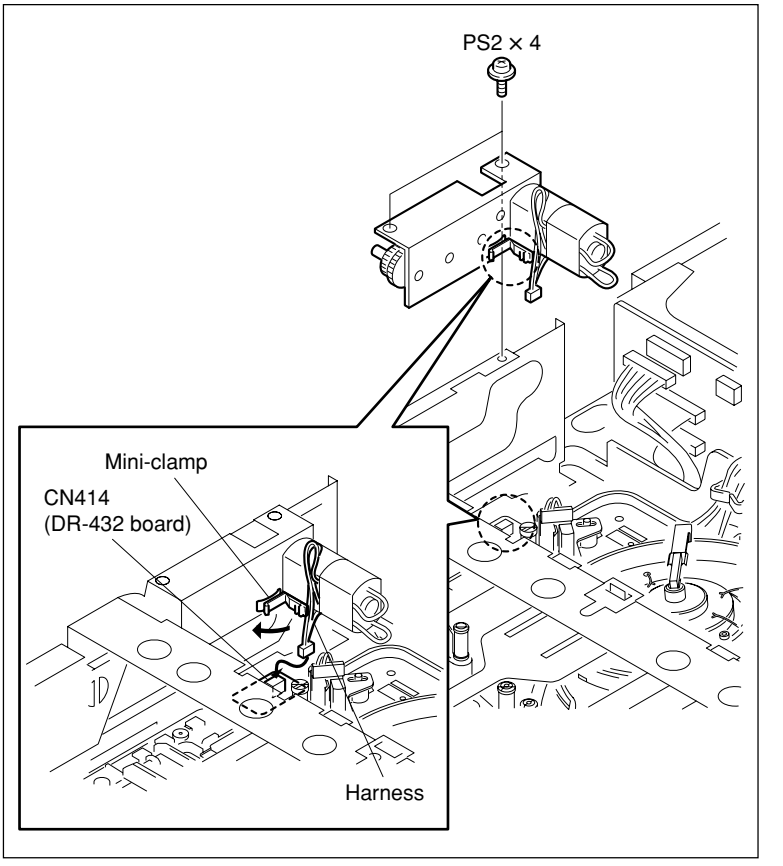
6. Installing the C motor holder block assembly

(1) Install the C motor holder block assembly with the two screws.

Note

Be careful that the deceleration gears drops if the C motor holder block assembly is slanted.

(2) Connect the harness of the C motor sub assembly to the connector (CN414) on the DR-432 board and fix it with the mini-clamp.



7. Checking operations

Insert and eject a cassette in order to check that a cassette tape can be inserted and ejected smoothly.

5-15. Shuttle S/T Block Assembly Replacement

Overview

Replacement

1. Removing the DM-124 board (Refer to Section 5-23-2.)
2. Removing the threading motor block assembly (Refer to Section 5-20.)
3. Removing the capstan brake and capstan motor (Refer to Section 5-8.)
4. Removing the drum block assembly
5. Removing the shuttle S block assembly or the shuttle T block assembly
6. Installing the shuttle S block assembly or the shuttle T block assembly
7. Installing the drum block assembly
8. Installing the capstan motor and the capstan brake (Refer to Section 5-8.)
9. Installing the threading motor block assembly (Refer to Section 5-20.)
10. Installing the DM-124 board (Refer to Section 5-23-2.)
11. Cleaning the tape guides (S1, S2, T1, T2) and the capstan shaft (Refer to Section 4-2-6.)

Adjustments after replacement

12. Tape running check (Refer to Section 6-2.)
13. Video tracking check and adjustment (Refer to Section 6-3.)
14. CTL head position check and adjustment (Refer to Section 6-4.)
15. AT head check and adjustment (Refer to Section 6-7.)

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) : J-6325-400-A
Torque screwdriver's bit (for M2) : J-6325-380-A

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the bottom plate assembly. (Refer to Section 1-4-2.)
4. Remove the cassette compartment assembly. (Refer to Section 1-5.)
5. Set the mechanical deck to the unthreading-end state. (Refer to Section 5-1-2.)

Removal Procedure

1. Removing the DM-124 board

(Refer to Section 5-23-2.)

2. Removing the threading motor block assembly

(Refer to Section 5-20.)

3. Removing the capstan brake and capstan motor

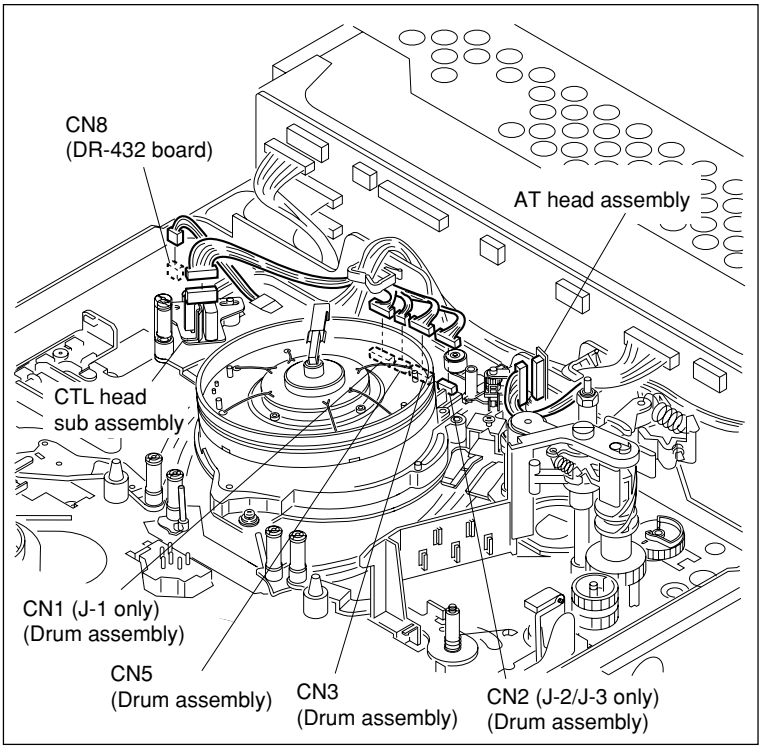
(Refer to Section 5-8.)

4. Removing the drum block assembly

(1) Disconnect the harnesses from the three connectors of each drum assembly.
J-1 : CN1, CN3, and CN5
J-2 : CN2, CN3, and CN5
J-3 : CN2, CN3, and CN5

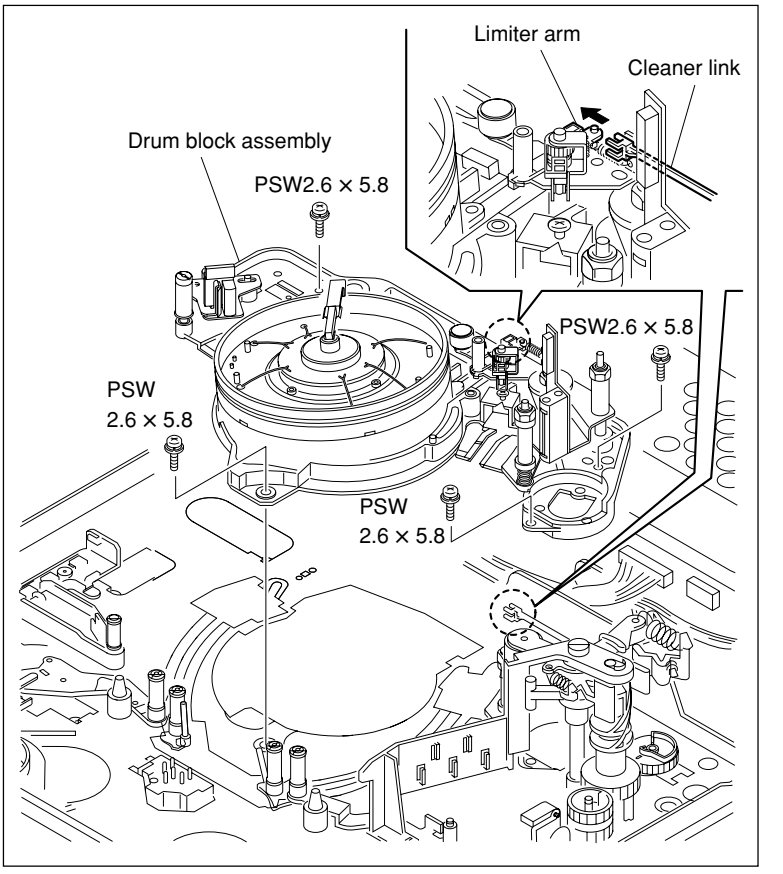
(2) Disconnect the harness from each connector of the CTL head sub assembly and AT head assembly.

(3) Disconnect the harness from the connector (CN8) on the DR-432 board.



(4) Press the limiter arm in the direction of the arrow to disengage the linkage from the cleaner link.

(5) Remove the four screws and remove the drum block assembly.

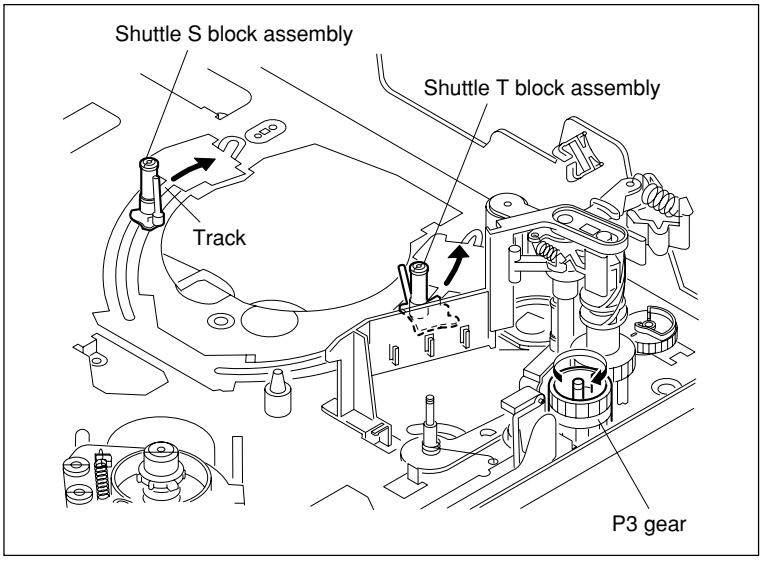


5. Removing the shuttle S block assembly or the shuttle T block assembly

(1) Rotate the P3 gear in the direction of the arrow and remove the shuttle S block assembly and the shuttle T block assembly from the tracks of the mechanism chassis.

Note

The shuttle S block assembly and the shuttle T block assembly are linked each other. If one of them is removed, both are removed from each track at the same time.

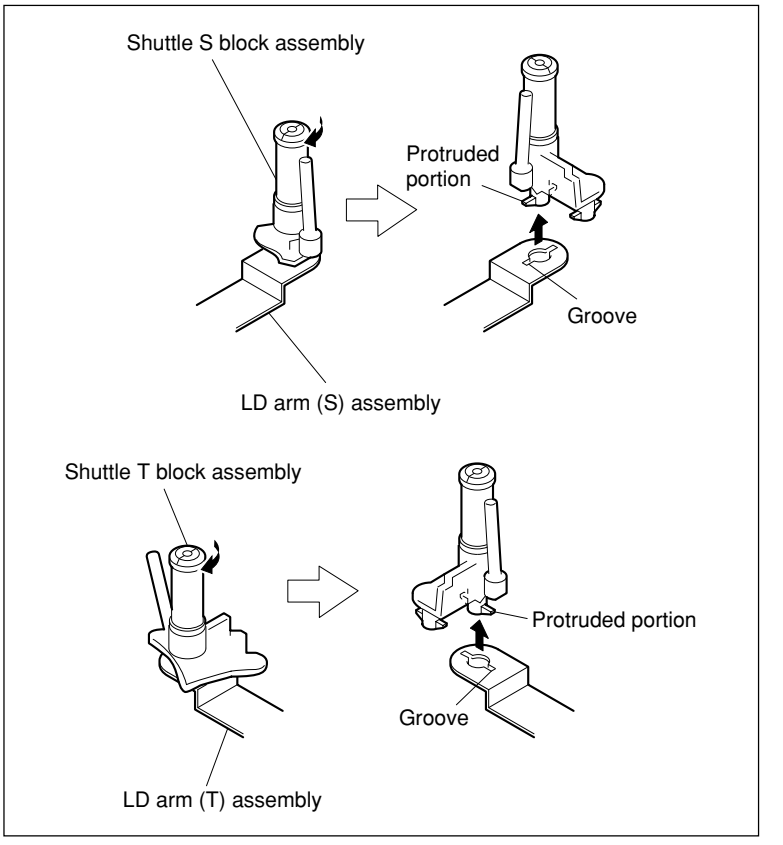


(2) **To remove the shuttle S block assembly**

Turn it by 90 degrees clockwise until the groove and the protruded portion are facing in the same direction. Then remove the shuttle S block assembly from the LD arm (S) assembly.

To remove the shuttle T block assembly

Turn it by 90 degrees counter-clockwise until the groove and the protruded portion are facing in the same direction. Then remove the shuttle T block assembly from the LD arm (T) assembly.



6. Installing the shuttle S block assembly or the shuttle T block assembly

Implement installation by reversing the steps of removal.

Note

The shuttle S block assembly and the shuttle T block assembly are linked each other. When either one of them is going to be inserted in the track of the mechanism chassis, inserted both of them at the same time.

7. Installing the drum block assembly

Implement installation by reversing the steps of removal.

8. Installing the capstan motor and the capstan brake

(Refer to Section 5-8.)

9. Installing the threading motor block assembly

(Refer to Section 5-20.)

10. Installing the DM-124 board

(Refer to Section 5-23-2.)

11. Cleaning the tape guides (S1, S2, T1, T2) and the capstan shaft

(Refer to Section 4-2-6.)

Adjustments after Replacement

12. Tape running check

(Refer to Section 6-2.)

13. Video tracking check and adjustment

(Refer to Section 6-3.)

14. CTL head position check and adjustment

(Refer to Section 6-4.)

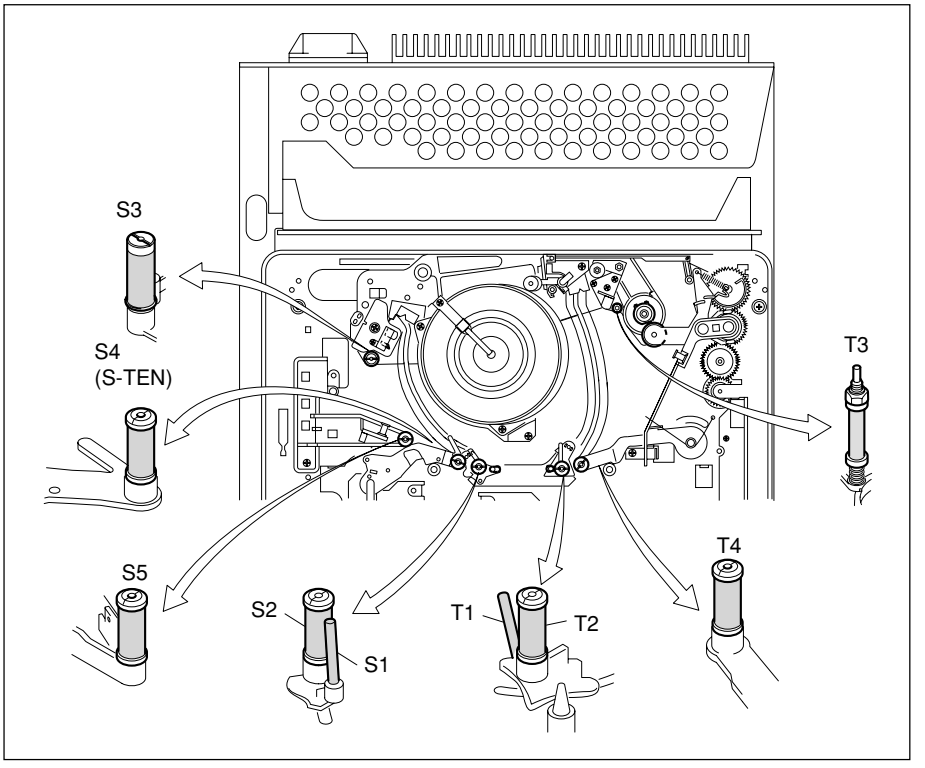
15. AT head check and adjustment

(Refer to Section 6-7.)

5-16. Tape Guide Replacement

The respective tape guides of the unit should be replaced in units of the following assemblies as described below.

S1 S2	Replace it as the shuttle S block assembly	Refer to Section 5-15.
S3	Replace it as the S3 guide assembly	Refer to Section 5-18.
S4	Replace it as the S-TEN arm assembly	Refer to Section 5-13.
S5	Replace it as the S5 guide base assembly	Refer to Section 5-17.
T1 T2	Replace it as the shuttle T block assembly	Refer to Section 5-15.
T3	Replace it as the single part of sleeve	Refer to Section 5-16-1.
T4	Replace it as the T4 assembly	Refer to Section 5-19.



5-16-1. T3 Tape Guide Replacement

Overview

Replacement

1. Removing the sleeve
2. Installing the sleeve
3. Cleaning the T3 tape guide (Refer to Section 4-2-6.)

Adjustments after replacement

4. Tape running check and adjustment (Refer to Section 6-2.)
5. Video tracking check (Refer to Section 6-3.)
6. CTL head position check (Refer to Section 6-4.)
7. AT head check (Refer to Section 6-7.)

Tools

Nut driver (d = 5.5 mm) : 7-700-751-02
Cleaning cloth

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)

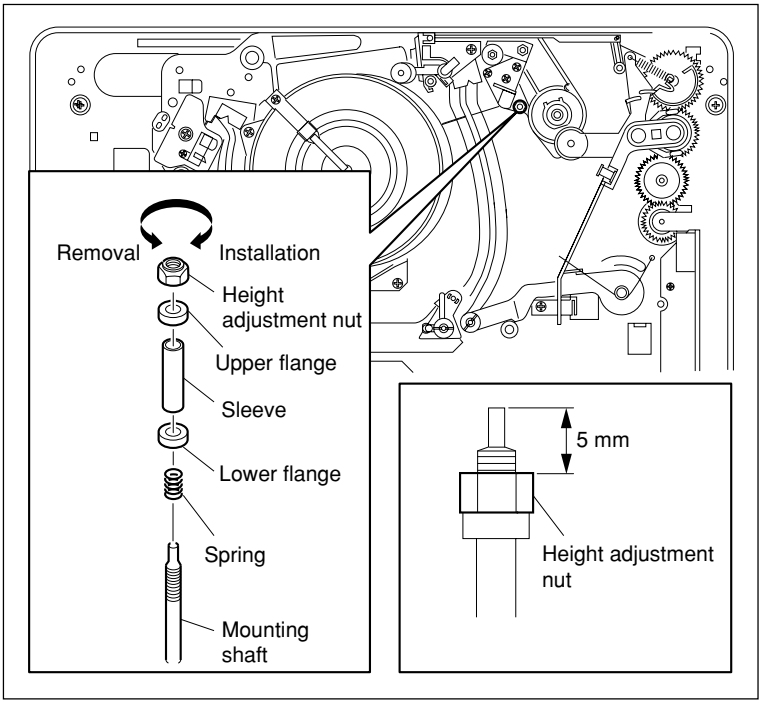
Removal Procedure

1. Removing the sleeve

(1) Rotate the height adjustment nut in the direction of the arrow (counter-clockwise) using a nut driver and remove it.
(2) Remove the upper flange, sleeve, lower flange, and spring from the mounting shaft.

2. Installing the sleeve

(1) Clean the mounting shaft with a dry cleaning cloth.
(2) Clean the removed upper flange and the lower flange with a dry cleaning cloth.
(3) Insert the removed spring and lower flange into the mounting shaft.
(4) Insert the new sleeve and the upper flange into the mounting shaft.
(5) Rotate the height adjustment nut in the direction of the arrow (clockwise) using a nut driver until it is installed in the specified height as shown in the illustration.



3. Cleaning the T3 tape guide

(Refer to Section 4-2-6.)

Adjustments after replacement

4. Tape running check and adjustment
(Refer to Section 6-2.)

5. Video tracking check
(Refer to Section 6-3.)

6. CTL head position check
(Refer to Section 6-4.)

7. AT head check
(Refer to Section 6-7.)

5-17. S5 Guide Base Assembly Replacement

When the S5 guide roller needs to be replaced, replace the entire S5 guide base assembly.

Overview

Replacement

1. Replacing the S5 guide base assembly
2. Cleaning the S5 guide roller (Refer to Section 4-2-6.)

Adjustments after replacement

3. Tape running check (Refer to Section 6-2.)
4. Video tracking check (Refer to Section 6-3.)
5. CTL head position check (Refer to Section 6-4.)
6. AT head check (Refer to Section 6-7.)

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) :	J-6325-400-A
Torque screwdriver's bit (for M2) :	J-6325-380-A
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01

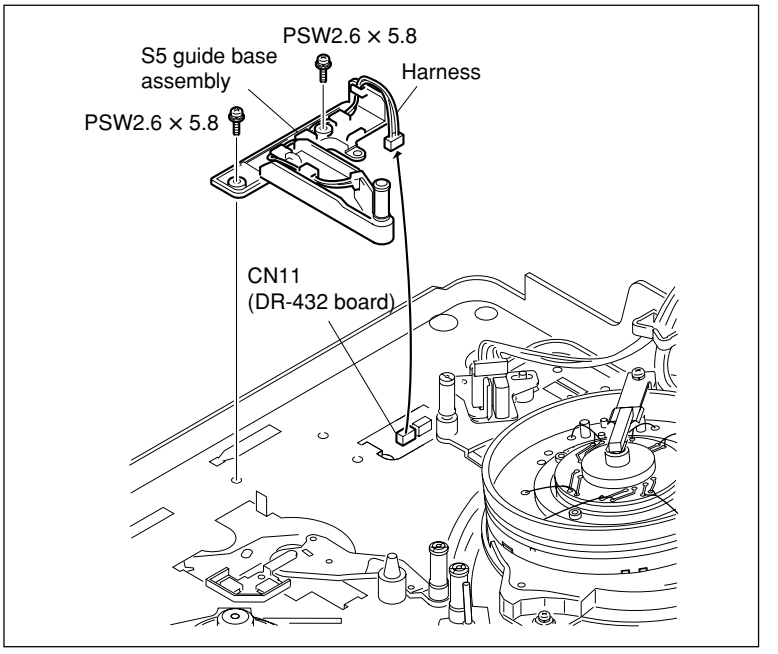
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)

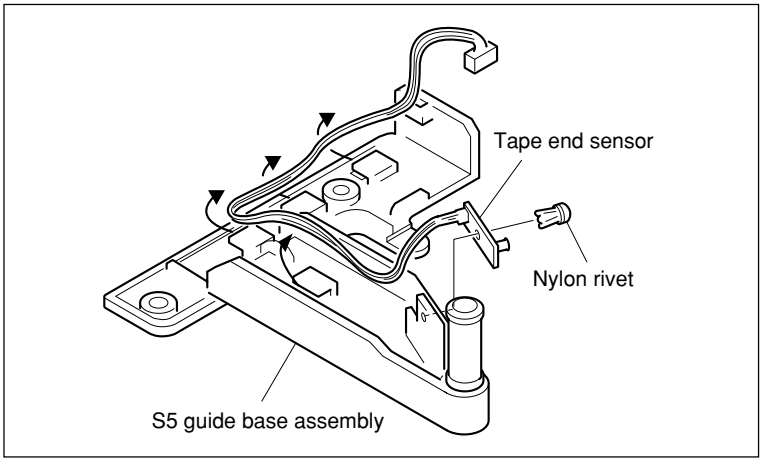
Removal/Installation Procedure

1. Replacing the S5 guide base assembly

(1) Disconnect the harness from the connector (CN11) on the DR-432 board.
(2) Remove the two screws and remove the S5 guide assembly.



(3) Remove the harness from the hooks of the S5 guide base assembly.
(4) Remove the nylon rivet and remove the tape end sensor.
(5) Install the new S5 guide base assembly by reversing the steps of removal.



2. Cleaning the S5 guide roller

(Refer to Section 4-2-6.)

Adjustments after Replacement

3. Tape running check
(Refer to Section 6-2.)

4. Video tracking check
(Refer to Section 6-3.)

5. CTL head position check
(Refer to Section 6-4.)

6. AT head check
(Refer to Section 6-7.)

5-18. S3 Guide Assembly Replacement

Overview

Replacement

1. Removing the S3 guide assembly
2. Installing the S3 guide assembly
3. Cleaning the S3 guide (Refer to Section 4-2-6.)

Adjustments after replacement

4. Tape running check (Refer to Section 6-2.)
5. Video tracking check (Refer to Section 6-3.)
6. CTL head position check (Refer to Section 6-4.)
7. AT head check (Refer to Section 6-7.)

Tools

Tape guide adjustment driver :	J-6082-044-A or J-6080-811-A
Cleaning cloth :	3-184-527-01
Cleaning fluid :	9-919-573-01
Oil (NT-68) :	7-661-018-18

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)

Removal Procedure

1. Removing the S3 guide assembly

Rotate the S3 guide assembly in the direction of the arrow (counter-clockwise) using the tape guide adjustment driver and remove it.

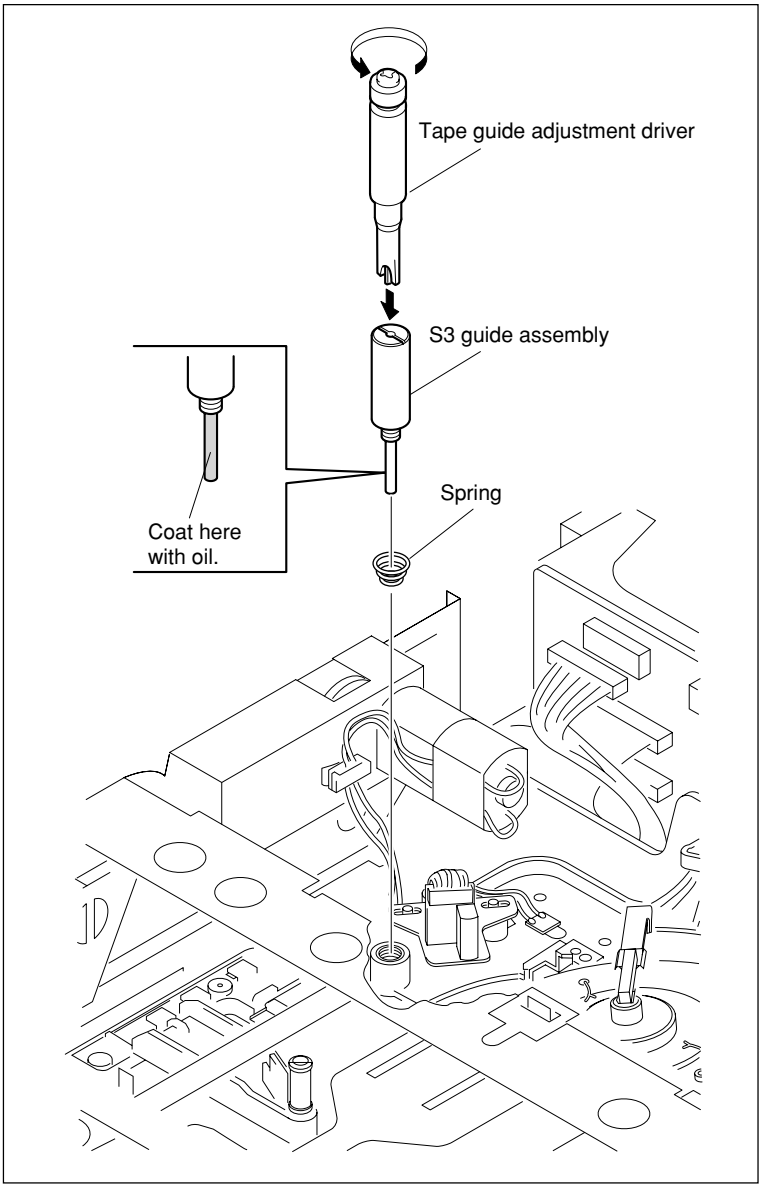
Note

When removing the S3 guide roller assembly, the spring drops off at the same time. Be careful not to lose the spring.

Installation Procedure

2. Installing the S3 guide assembly

Coat the shaft (the area shown by hatching ▭ in the illustration) of the S3 guide assembly with oil, then install the S3 guide assembly by reversing the steps of removal.



3. Cleaning the S3 guide

(Refer to Section 4-2-6.)

Adjustments after Replacement

4. Tape running check
(Refer to Section 6-2.)

5. Video tracking check
(Refer to Section 6-3.)

6. CTL head position check
(Refer to Section 6-4.)

7. AT head check
(Refer to Section 6-7.)

5-19. T4 Assembly Replacement

When the T4 guide roller needs to be replaced, replace the entire T4 assembly.

Overview

Replacement

1. Removing the tape top sensor assembly
2. Removing the T4 assembly
3. Coating the mounting shaft with oil
4. Installing the T4 assembly
5. Installing the tape top sensor assembly
6. Cleaning the T4 guide roller (Refer to Section 4-2-6.)

Adjustments after replacement

7. Tape running check (Refer to Section 6-2.)
8. Video tracking check (Refer to Section 6-3.)
9. CTL head position check (Refer to Section 6-4.)
10. AT head check (Refer to Section 6-7.)

Note

Stop washers 1.5 are used to fix the T4 assembly.
Prepare the new stop washer 1.5 (3-669-465-01) when the T4 assembly is replaced.
Never re-use the stop washer.

Tools

Cleaning cloth : 3-184-527-01
Cleaning fluid : 9-919-573-01
Oil (NT-68) : 7-661-018-18

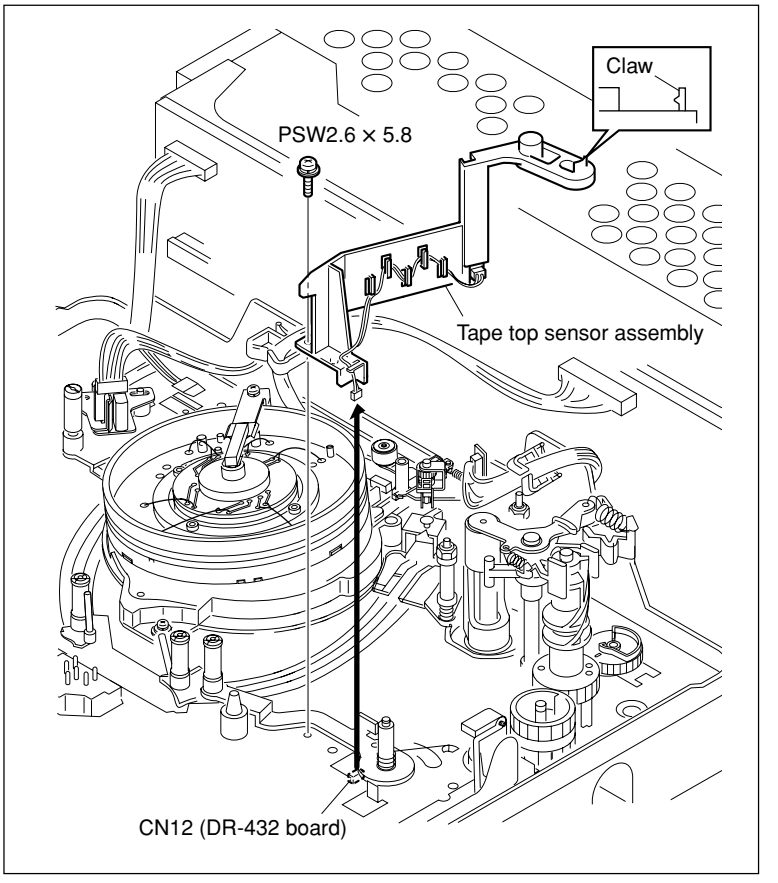
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Check that the mechanical deck is in the unthreading-end state. (Refer to Section 5-1-2.)

Removal Procedure

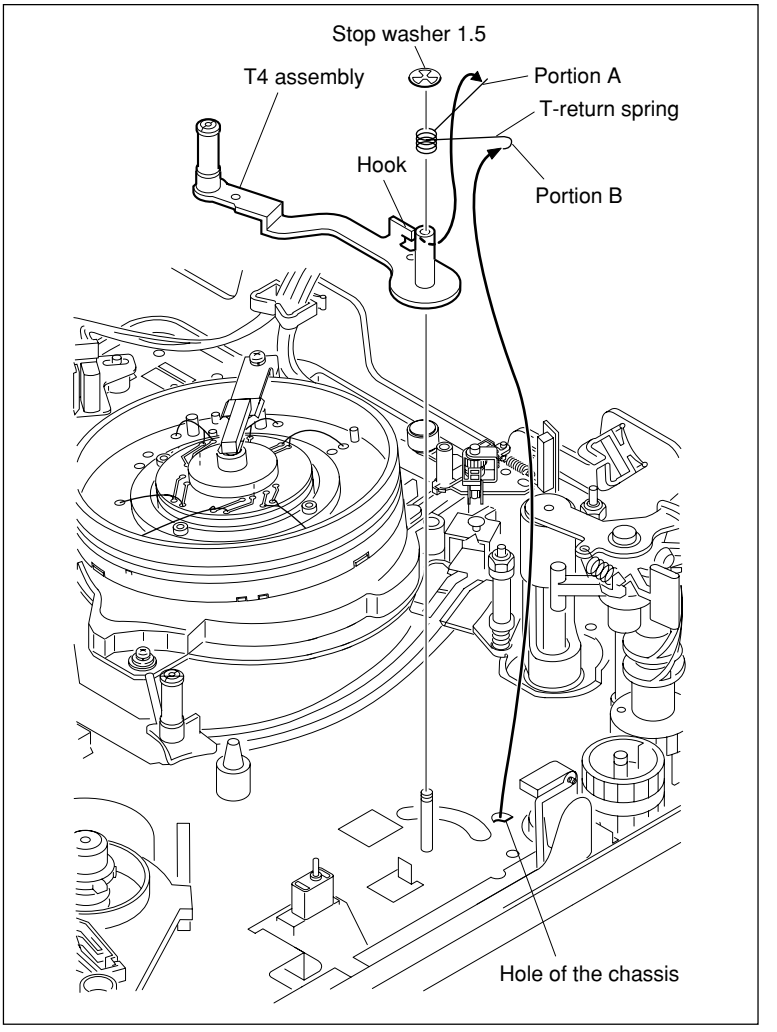
1. Removing the tape top sensor assembly

(1) Disconnect the harness from the connector (CN12) on the DR-432 board.
(2) Remove the screw.
(3) Unhook the claw and than remove the tape top sensor assembly.



2. Removing the T4 assembly

(1) Remove the stop washer 1.5.
(2) Remove the portion A of the T-return spring from the hook of the T4 assembly. Remove the portion B of the T-return spring from the hole of the chassis and remove the spring.
(3) Remove the T4 assembly.



Installation Procedure

3. Coating the mounting shaft with oil

Coat the mounting shaft with a drop of oil.

4. Installing the T4 assembly

(1) Install the new T4 assembly to the mounting shaft.

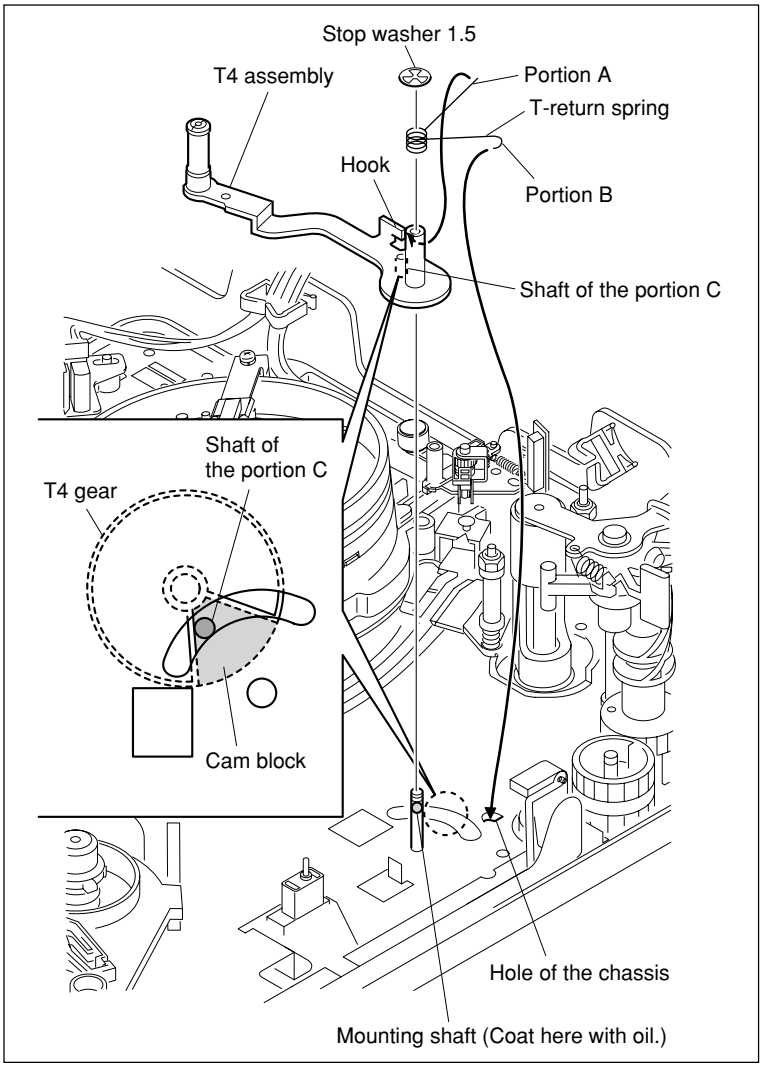
Note

Check that shaft of the portion C of the T4 assembly enters the cam block of the T4 gear.

(2) Pass the T-return spring through the shaft of the T4 assembly. After that, hook the portion B of the T-return spring to the hole of the chassis.

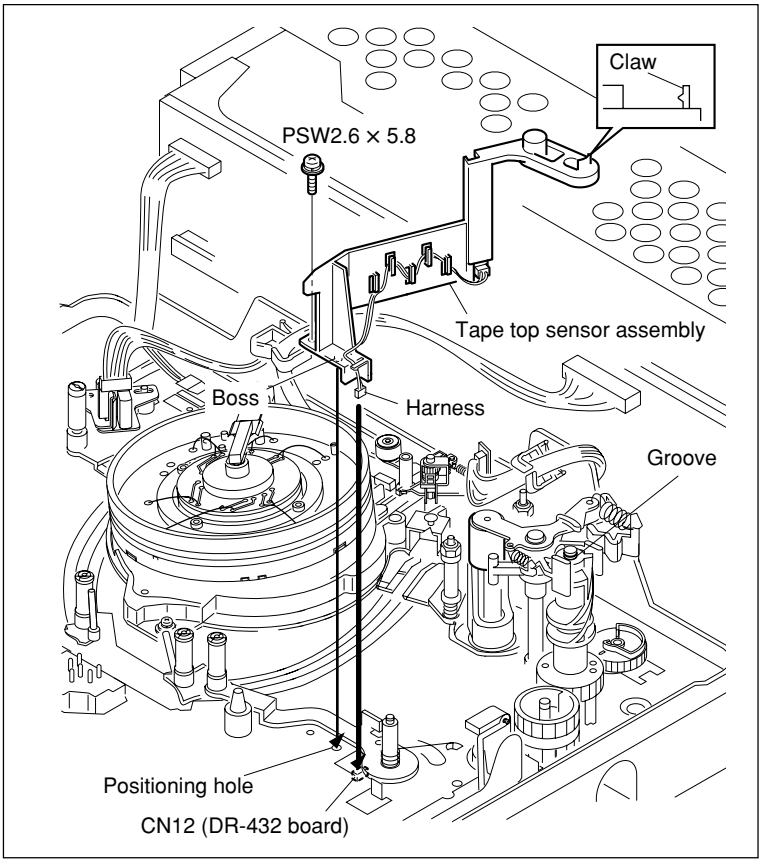
(3) Hang the portion A of the T-return spring to the hook of the T4 assembly.

(4) Set the new stop washer 1.5 to the mounting shaft.



5. Installing the tape top sensor assembly

(1) Align the boss of the tape top sensor assembly to the positioning hole and fix it with screw. When doing so, check that the claw enter the groove of the shaft.
(2) Connect the harness to the connector (CN12) on the DR-432 board.



6. Cleaning the T4 guide roller

(Refer to Section 4-2-6.)

Adjustments after Replacement

7. Tape running check

(Refer to Section 6-2.)

8. Video tracking check

(Refer to Section 6-3.)

9. CTL head position check

(Refer to Section 6-4.)

10. AT head check

(Refer to Section 6-7.)

5-20. Threading Motor Replacement

When the threading motor needs to be replaced, replace in units of the threading motor block assembly.

Overview

Replacement

1. Removing the threading motor block assembly
2. Greasing up
3. Installing the threading motor block assembly
4. Checking operations

Tools

Torque screwdriver (0.3 N•m {3 kgf•cm}) : J-6325-400-A
Torque screwdriver's bit (for M2) : J-6325-380-A
Moly-coat grease (PG-622) : 7-651-000-59

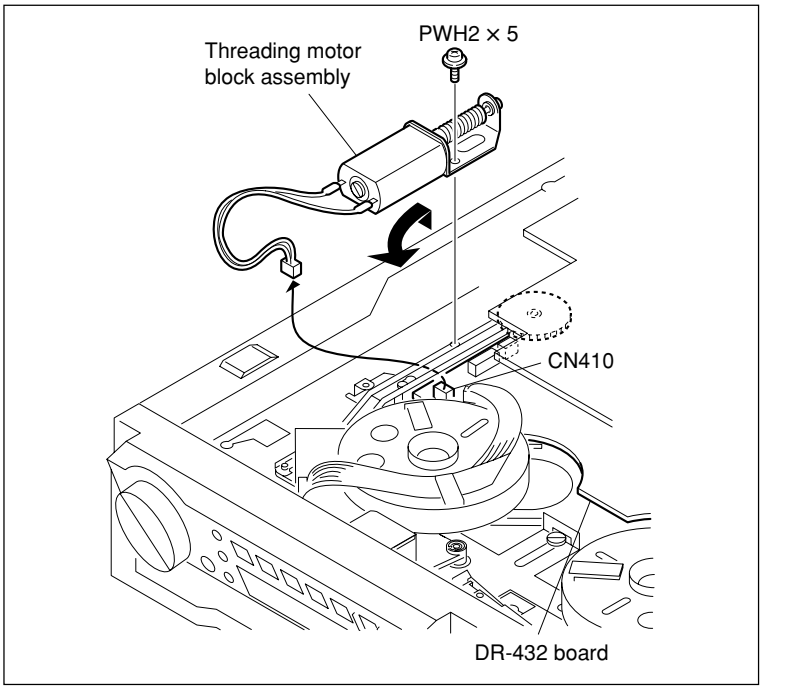
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the bottom panel assembly. (Refer to Section 1-4-2.)

Removal Procedure

1. Removing the threading motor block assembly

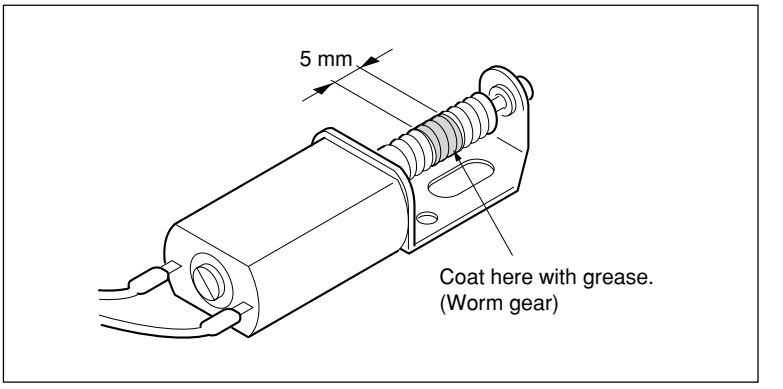
(1) Disconnect the harness from the connector (CN410) on the DR-432 board.
(2) Remove the screw.
(3) Hold the motor block vertically and remove the threading motor block assembly in the direction of the arrow.



Installation Procedure

2. Greasing up

Coat the worm gear of the new threading motor block assembly with grease over the entire circumference in the width of 5 mm in the center of the worm gear.



3. Installing the threading motor block assembly

(1) Hold the motor block vertically and place the threading motor block assembly to the mounting position of the mechanism chassis side from the worm gear side.

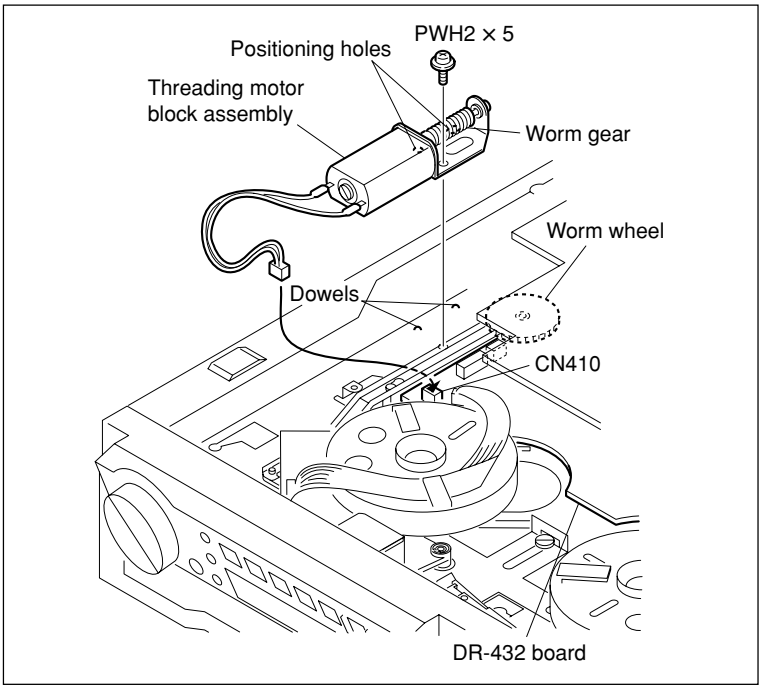
(2) Check the following points.
- The two positioning holes must be aligned to the dowels on the mechanism chassis.
- The worm gear must engage with the worm wheel on the mechanism chassis.

(3) Fix the threading motor block assembly with the single screws.

(4) Connect the harness to the connector (CN410) on the DR-432 board.

Note

Connect the harness of the threading motor block assembly by passing underneath of capstan brake block assembly.



4. Checking operations

Insert a cassette tape and check to see that the mechanical deck performs the threading and unthreading smoothly.

5-21. Plunger Solenoid Replacement

Overview

Replacement

1. Removing the CCM-48 board (Refer to Section 5-23-1.)
2. Removing the DM-124 board (Refer to Section 5-23-2.)
3. Removing the capstan brake
4. Removing the plunger solenoid
5. Installing the plunger solenoid
6. Installing the capstan brake and adjusting the capstan brake position
7. Installing the DM-124 board (Refer to Section 5-23-2.)
8. Installing the CCM-48 board (Refer to Section 5-23-1.)

Tools

Torque screwdriver (0.3 N•m{3 kgf•cm}) : J-6325-400-A
Torque screwdriver's bit (for M2) : J-6325-380-A

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the bottom panel assembly. (Refer to Section 1-4-2.)
4. Remove the front panel assembly. (Refer to Section 1-4-3.)
5. Remove the cassette compartment assembly. (Refer to Section 1-5.)
6. Change the reel shift position to the S-cassette position.
   (Refer to Section 5-1-3.)

Removal Procedure

1. Removing the CCM-48 board

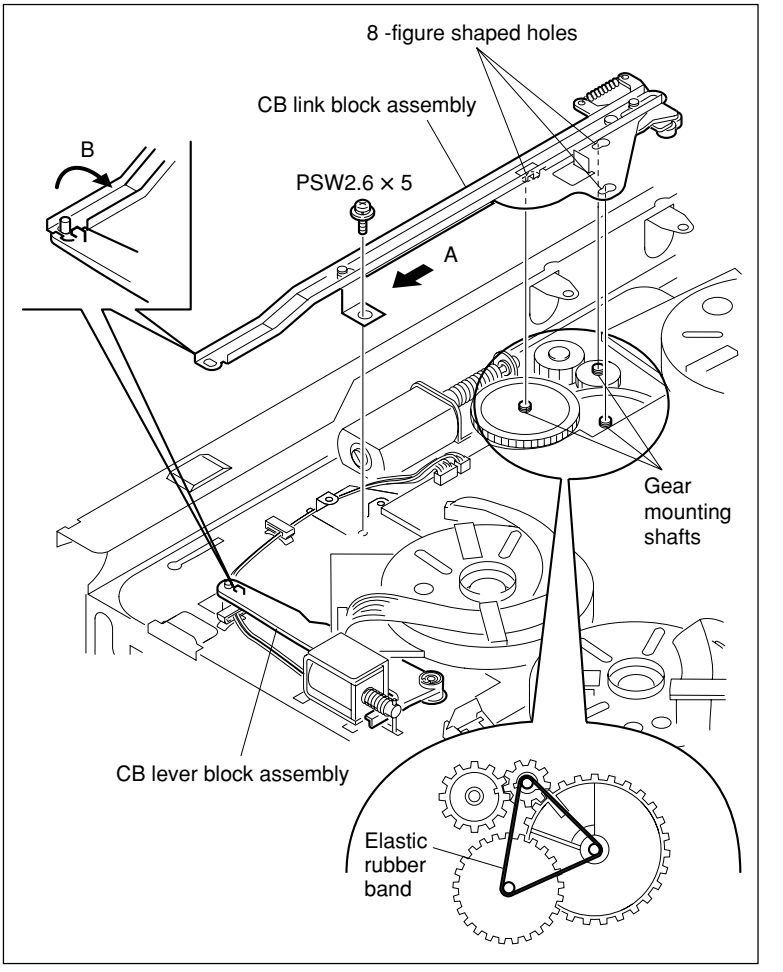
(Refer to Section 5-23-1.)

2. Removing the DM-124 board

(Refer to Section 5-23-2.)

3. Removing the capstan brake

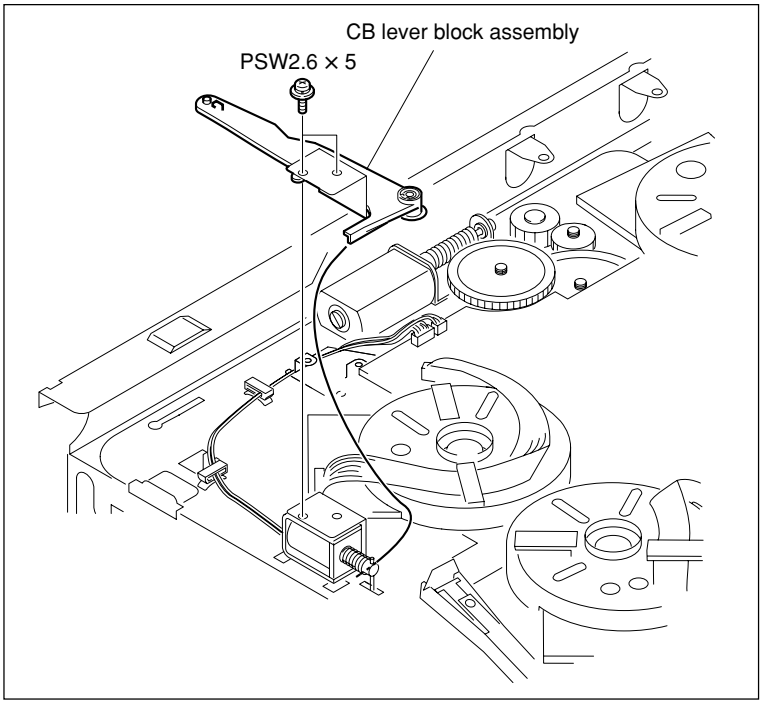
(1) Remove the screw.
(2) Push the CB link block assembly in the direction of arrow A until it is disengaged from the three gear mounting shafts.
(3) Twist the CB link block assembly gently in the direction of arrow B until it is disengaged from the CB lever block assembly, and remove it.
(4) Fix the gears tentatively by hooking an elastic rubber band as shown.



Note

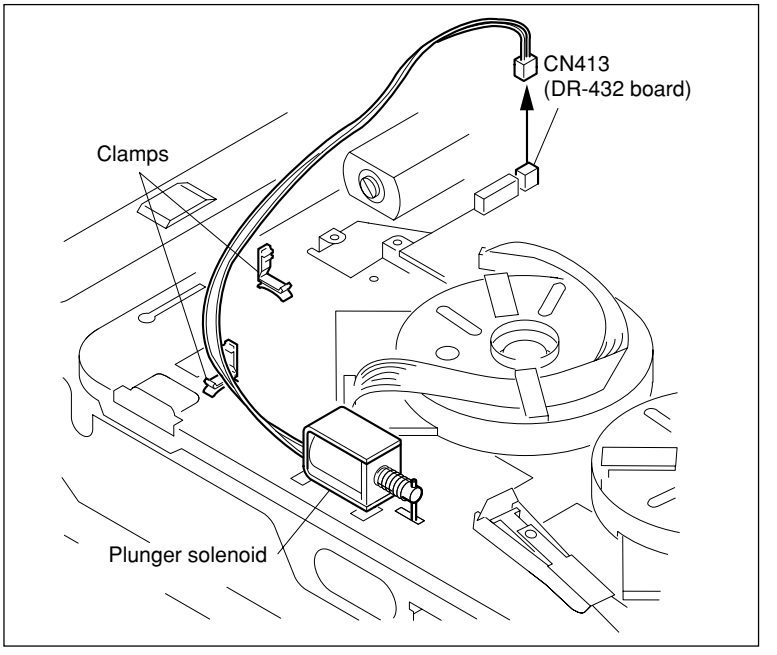
If the CB link block assembly is left removed, the gear may drop off.
Fix the gears tentatively by hooking an elastic rubber band until installation of the CB link block assembly is completed.
If the gear drops off, perform the phase adjustment of the gear. (Refer to Section 5-1-6.)

(5) Remove the two screws and remove the CB lever assembly.



4. Removing the plunger solenoid

(1) Disconnect the harness from the connector (CN413) on the DR-432 board.
(2) Release the two clamps and withdraw the harness of the plunger solenoid.



(3) Remove the two screws in the order starting from ① then ②. When removing the screw ②, this screw is hidden under the release link. Therefore, open the release link in the direction of the arrow first as shown. In such a state (as the movable iron core is pushed into the plunger solenoid), remove the screw ②.

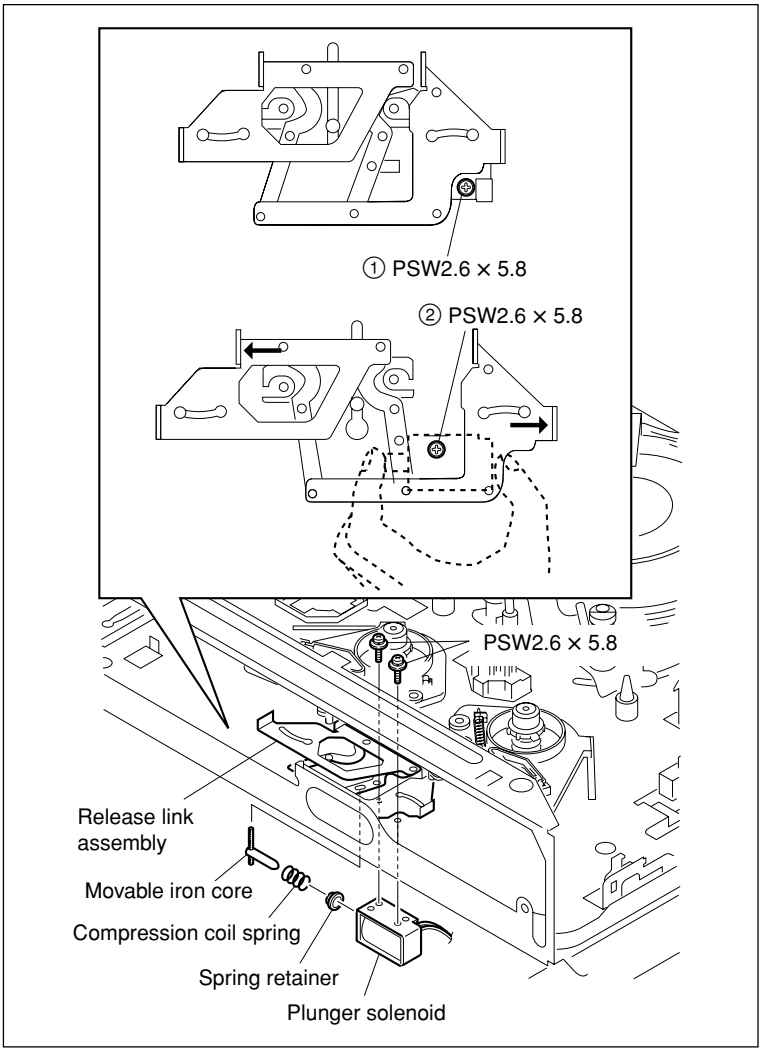
Note

When removing the screw ②, hold the plunger solenoid and the movable iron core firmly with hands so that the solenoid plunger jumps off to its side with the force of the compression coil spring.

(4) Remove the plunger solenoid in the way of removing the movable iron core from the release link assembly.

Note

When removing the plunger solenoid, be careful not to lose the movable iron core, compression coil spring, and spring retainer.



Installation Procedure

5. Installing the plunger solenoid

(1) Install the compression coil spring and spring retainer between the plunger solenoid and the movable iron core.

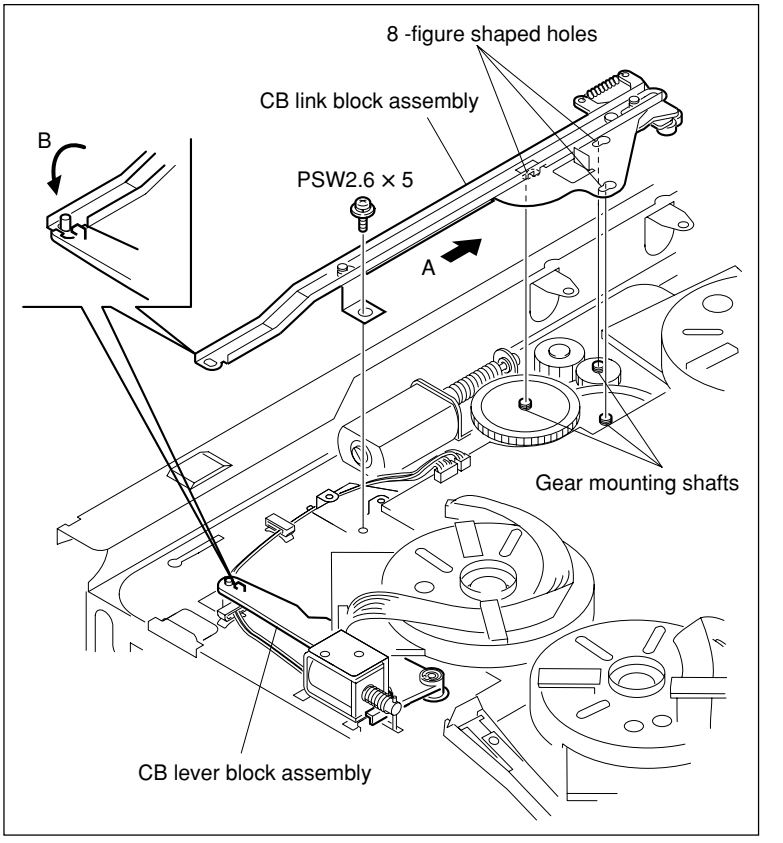
(2) Install the plunger solenoid by reversing the steps of removal.

Notes

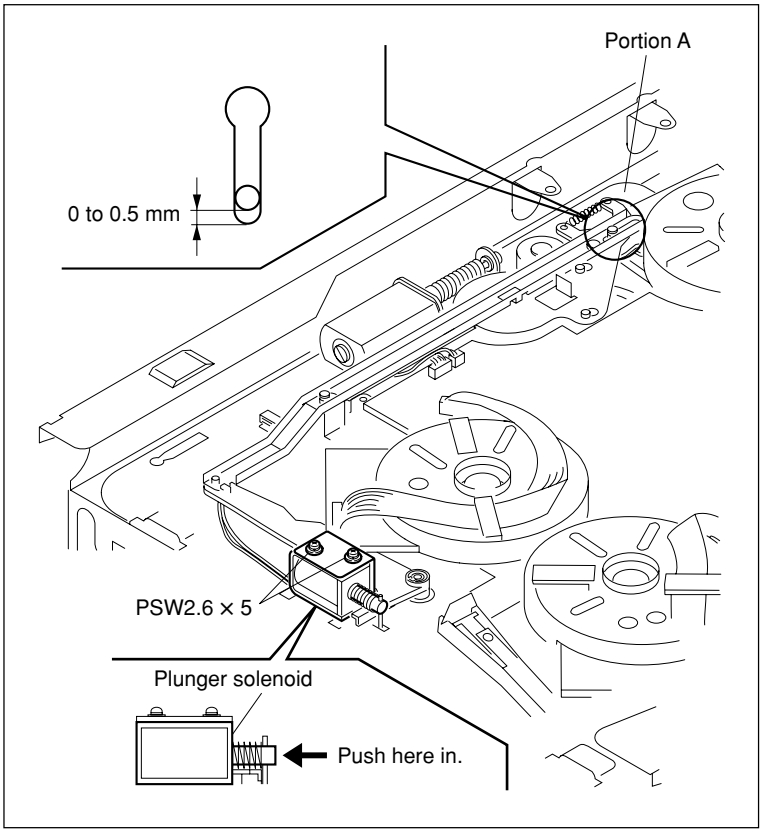
- Screws (PSW2.6 × 5.8) that fixes the plunger solenoid to the mechanism chassis.
  Tightening torque:
  40 to 45 × 10^{-2} N•m {4.1 to 4.6 kgf•cm}
- Tighten tentatively the screws (PSW2.6 × 5) that fixes the CB lever block assembly to the plunger solenoid. Tighten them finally after the capstan brake position adjustment is completed.

6. Installing the capstan brake and adjusting the capstan brake position

(1) Install the CB lever block assembly tentatively by reversing the steps of removal.
(2) Couple the CB link block assembly into the CB lever block assembly and the three gear mounting shafts.
(3) Push the CB link block assembly in the direction of arrow A as far as it can go and secure it with the screws.



(4) While the iron core of the plunger solenoid is being pushed in, adjust the position of the CB lever block assembly until the clearance of the portion A meets the specification. Tighten the two screws while the specification is being met.
Specification : Clearance = 0 to 0.5 mm



7. Installing the DM-124 board

(Refer to Section 5-23-2.)

8. Installing the CCM-48 board

(Refer to Section 5-23-1.)

5-22. Power Assembly Replacement

When the power assembly needs to be replaced, replace the entire power assembly including the AC inlet.

Note

The J series does not require any electrical adjustments even when the power assembly is replaced.

Overview

Replacement

1. Removing the power assembly
2. Checking the output voltage of the power assembly
3. Installing the power assembly

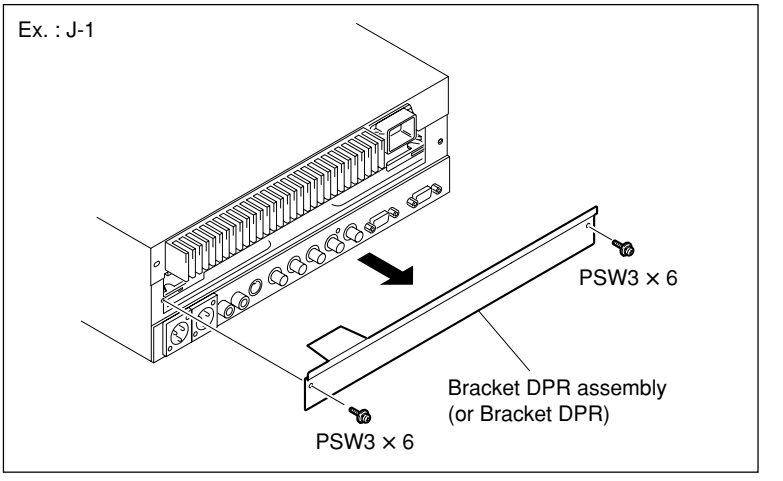
Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)

Removal Procedure

1. Removing the power assembly

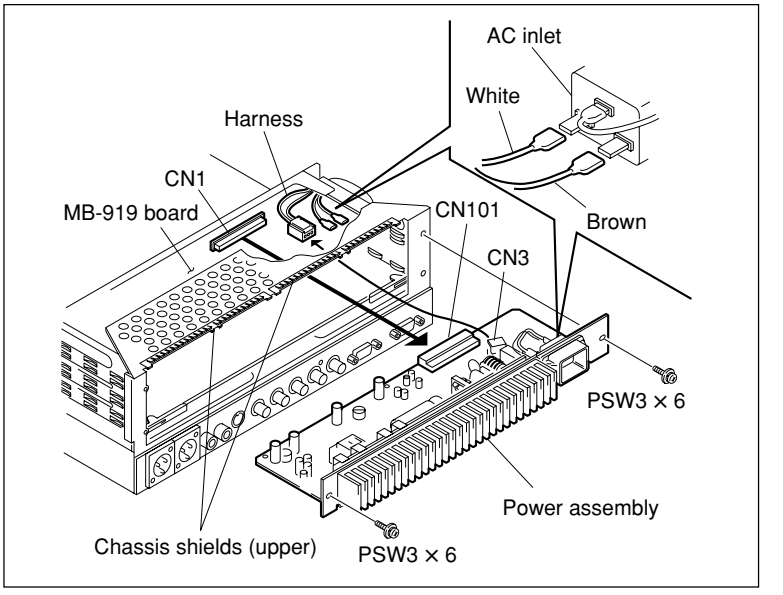
(1) Remove the two screws and remove the bracket DPR assembly (J-1)/bracket DPR (J-2/J-3).



(2) Disconnect the harness from the connector (CN3) of the power assembly.
(3) Disconnect the harnesses (white and brown) from the AC inlet.
(4) Remove the two screws and pull the power assembly out.

Note

When removing the power assembly, be careful not to drop the chassis shield (upper).



Installation Procedure

2. Checking the output voltage of the power assembly

Note

Perform this check only when the power assembly is replaced.

(1) Check the output voltage of the power assembly. (Refer to Section 8-2.)
(2) Remove the harnesses that is being connected.

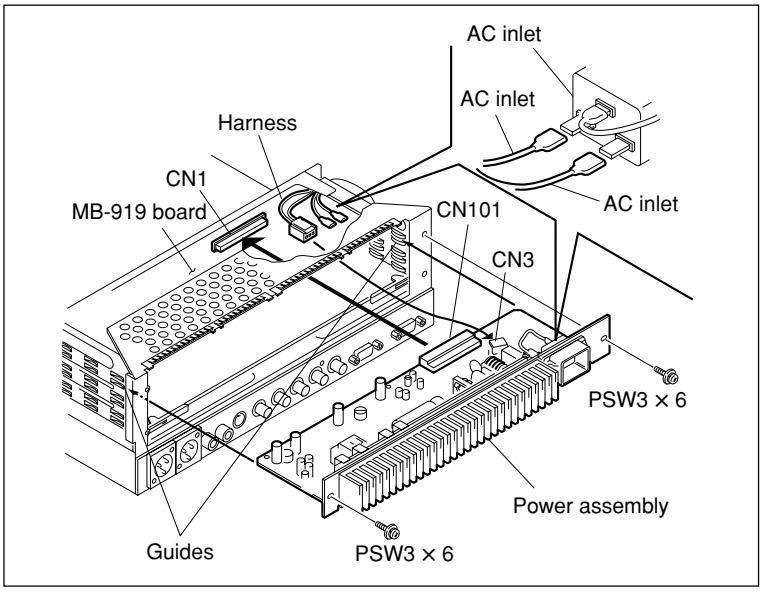
3. Installing the power assembly

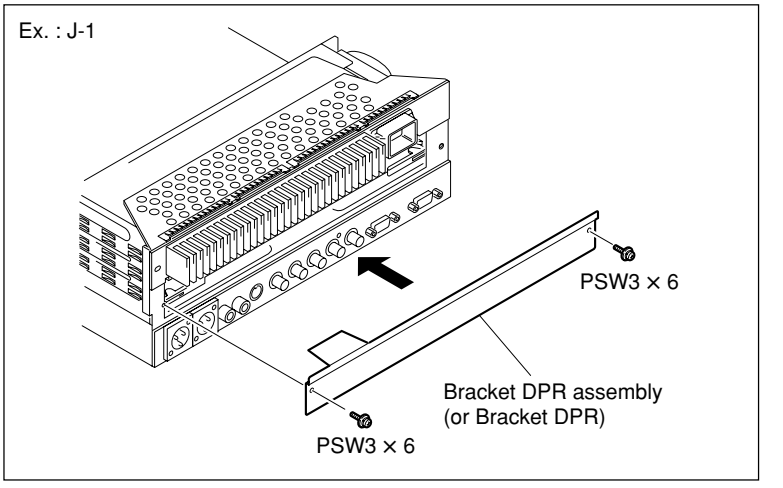
(1) Insert the power assembly along with the guides.
(2) Connect the connector (CN101) on the power assembly to the connector (CN1) on the MB-919 board.

Note

Be careful that the main unit does not move during this work.

(3) Fix the power assembly with the two screws.
(4) Connect the harness to the connector (CN3) of the power assembly.
(5) Connect the harnesses (white and brown) to the AC inlet.
(6) Install the bracket DPR assembly (J-1)/ bracket DPR (J-2/J-3) with the two screws.





5-23. Board Replacement

5-23-1. CCM-48 Board

Tools

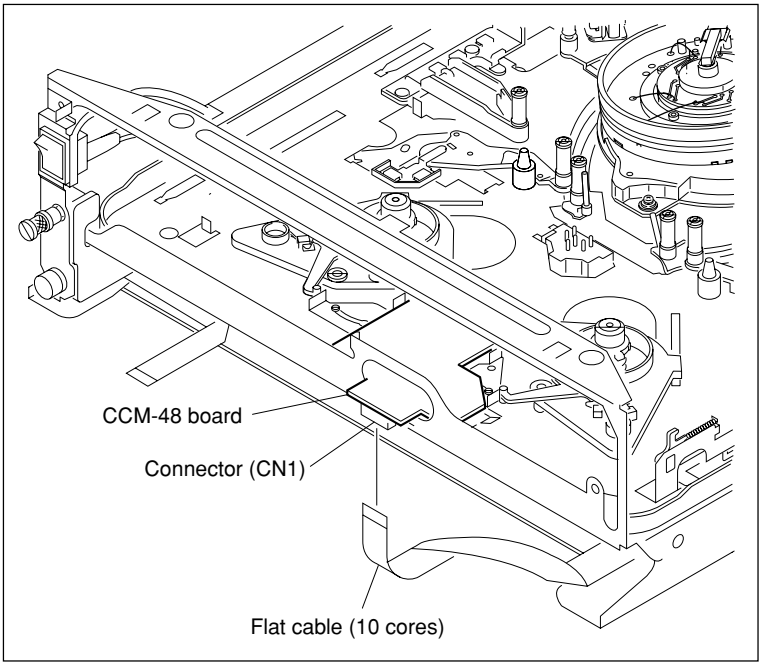
Torque screwdriver (0.3 N•m {3 kgf•cm}) : J-6325-400-A
Torque screwdriver's bit (for M2) : J-6325-380-A

Preparation

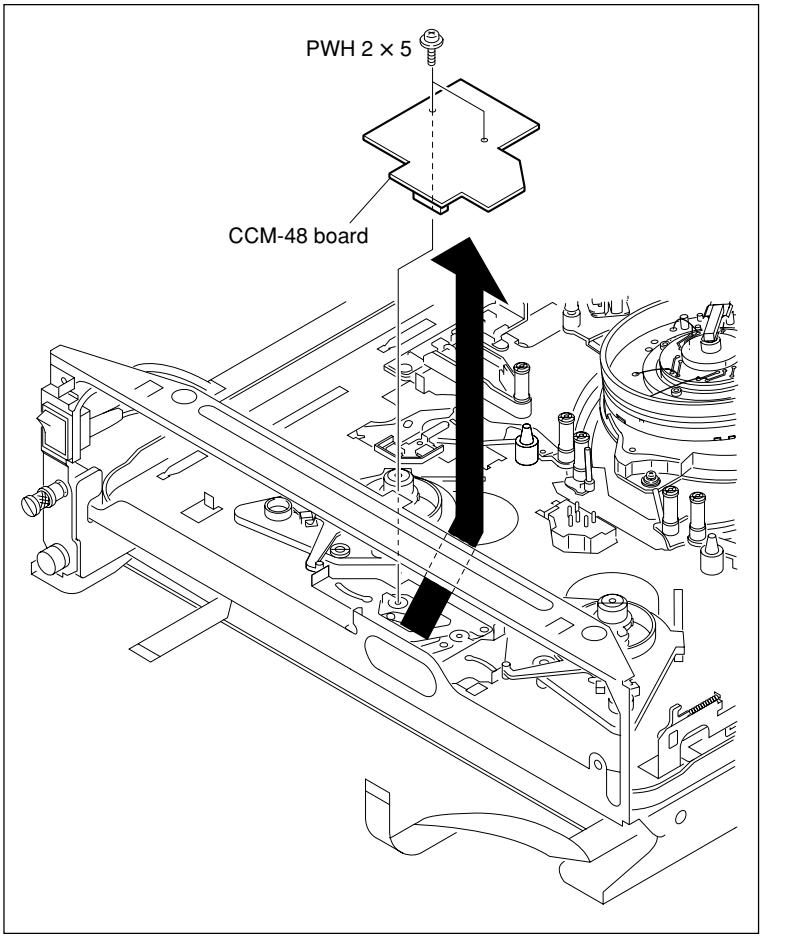
1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the front panel assembly. (Refer to Section 1-4-3.)
4. Remove the cassette compartment assembly. (Refer to Section 1-5.)

Removal Procedure

1. Disconnect the flat cable (10 cores) from the connector (CN1) on the CCM-48 board.



2. Remove the two screws and remove the CCM-48 board in the direction of the arrow.



Installation Procedure

1. Implement installation by reversing the steps of removal.

   Note

   When installing the CCM-48 board, be sure to use the screws of type PWH2 × 5. If screws of other types are used, the screw head contacts with the cassette so that the screw moves the cassette up.
   Screw tightening torque when fixing the CCM-48 board : 20×10^{-2} N•m {2 kgf•cm}

2. After installing the cassette compartment assembly and the front panel assembly, implement the setup that is required after replacement. (Refer to Section 1-20-1.)

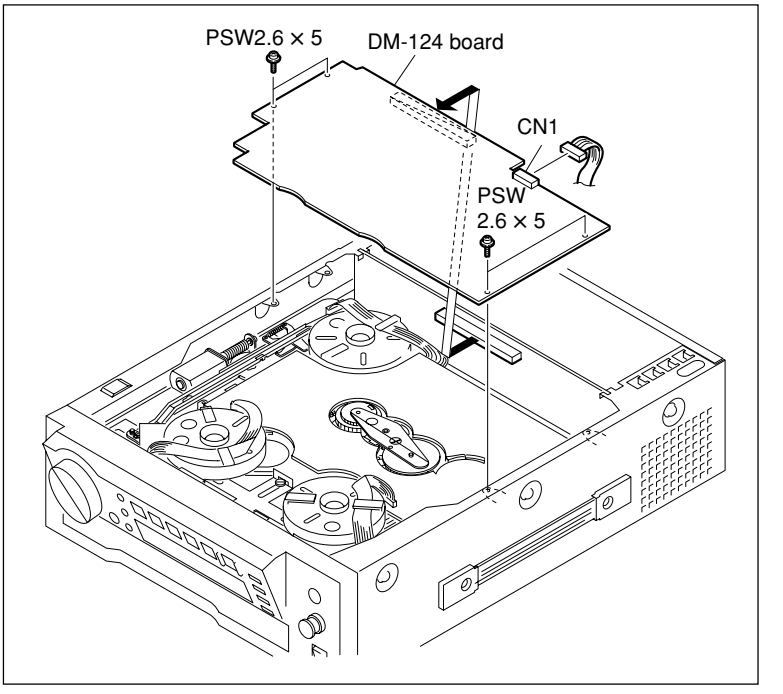
5-23-2. DM-124 Board

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the bottom panel assembly. (Refer to Section 1-4-2.)

Removal Procedure

1. Disconnect the harness from the connector (CN1) of the DM-124 board.
2. Remove the four screws.
3. Remove the DM-124 board from the connector (CN400) on the MB-919 board first. Then remove the DM-124 board in the direction of the arrow.



Installation Procedure

1. Implement installation by reversing the steps of removal.
2. Implement the setup that is required after replacement. (Refer to Section 1-20-2.)

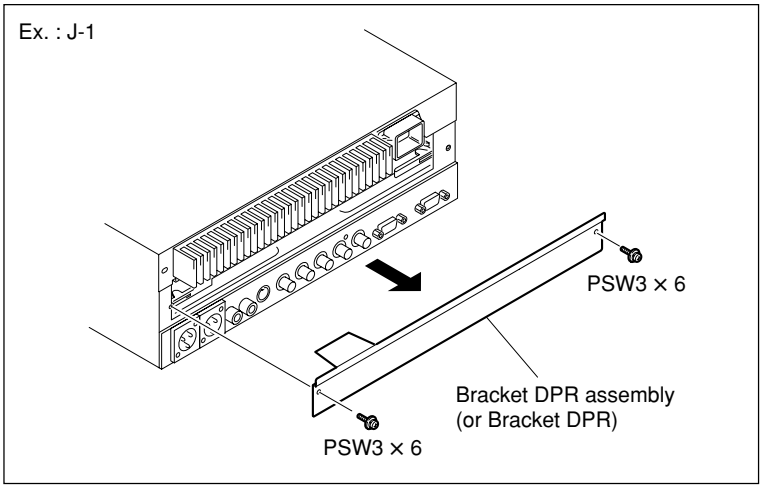
5-23-3. DPR-172/174 Board

Preparation

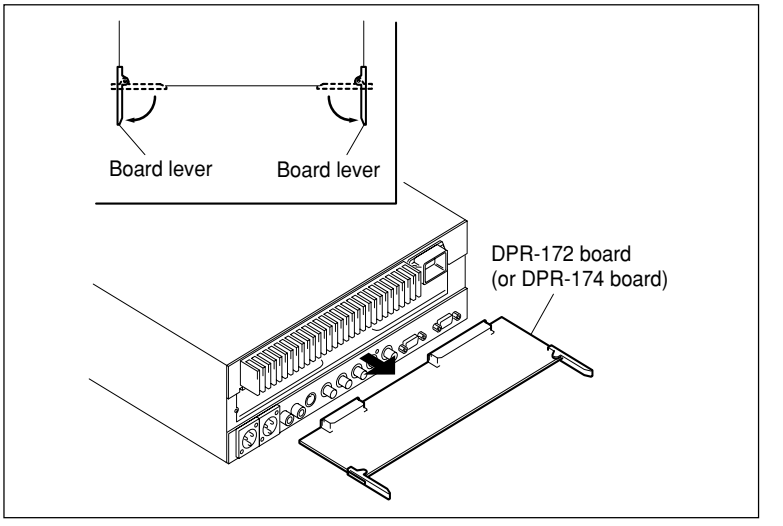
1. Turn off the POWER switch and disconnect the AC power cord.

Removal Procedure

1. Remove the two screws and remove the bracket DPR assembly (J-1)/bracket DPR (J-2/J-3).



2. Open the board lever in the direction of the arrow and pull the DPR-172 board (J-1)/ DPR-174 board (J-2/J-3) out from the slot.



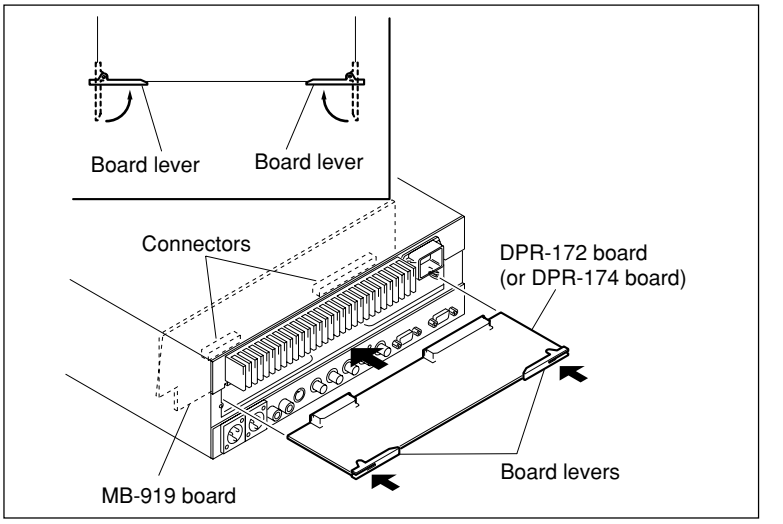
Installation Procedure

1. Insert the DPR-172/174 board along with the guides while the board lever is being folded.
2. Strongly push the two board levers so that the connectors on the DPR-172/174 board are securely inserted into the connectors on the MB-919 board.

   Note

   Be careful that the main unit does not move during this work.

3. Implement the setup that is required after replacement. (Refer to Section 1-20-3.)



5-23-4. DR-432 Board

Tools

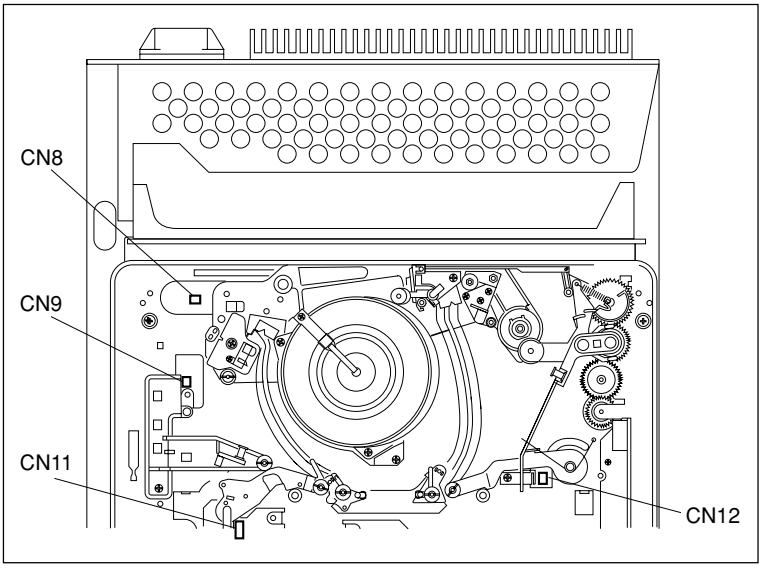
Torque screwdriver (0.3 N•m {3 kgf•cm}) : J-6325-400-A
Torque screwdriver's bit (for M2) : J-6325-380-A

Preparation

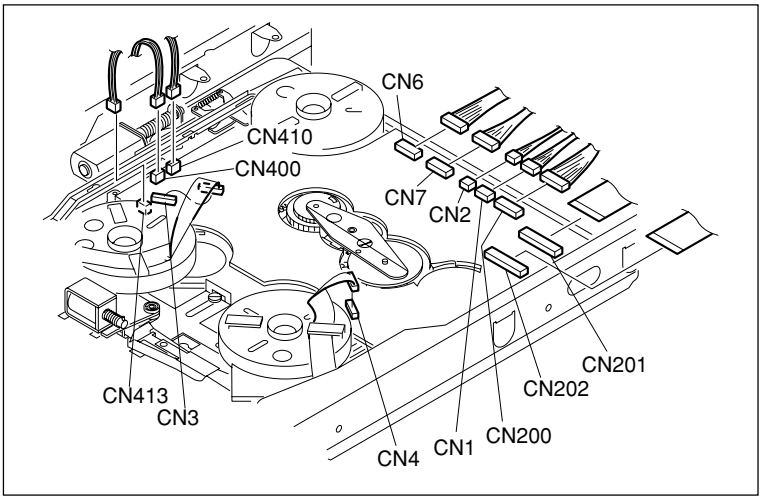
1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the bottom panel assembly. (Refer to Section 1-4-2.)
3. Remove the DM-124 board. (Refer to Section 5-23-2.)
4. Remove the top panel assembly. (Refer to Section 1-4-1.)
5. Remove the cassette compartment assembly. (Refer to Section 1-5.)

Removal Procedure

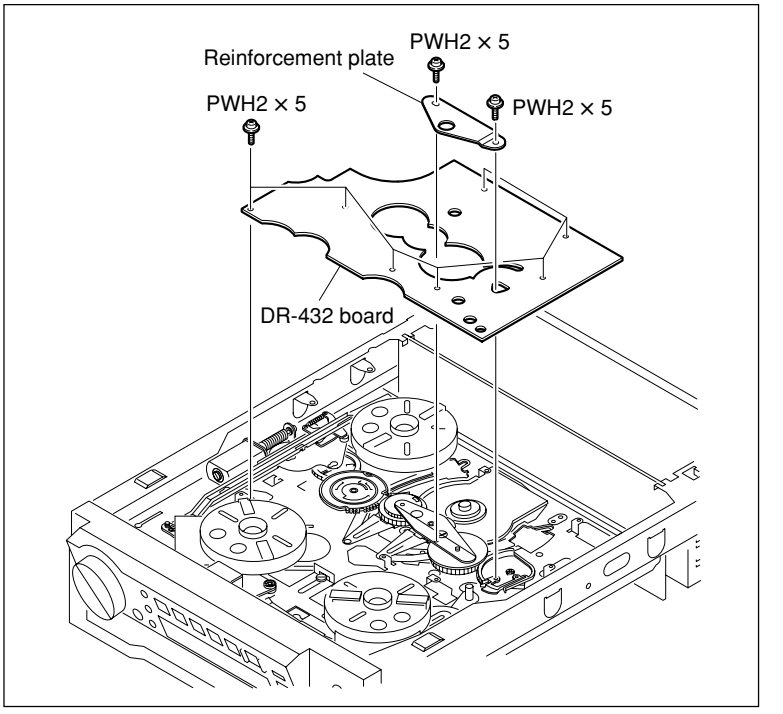
1. Disconnect four the harnesses from the connectors (CN8, CN9, CN11, and CN12) on the DR-432 board.



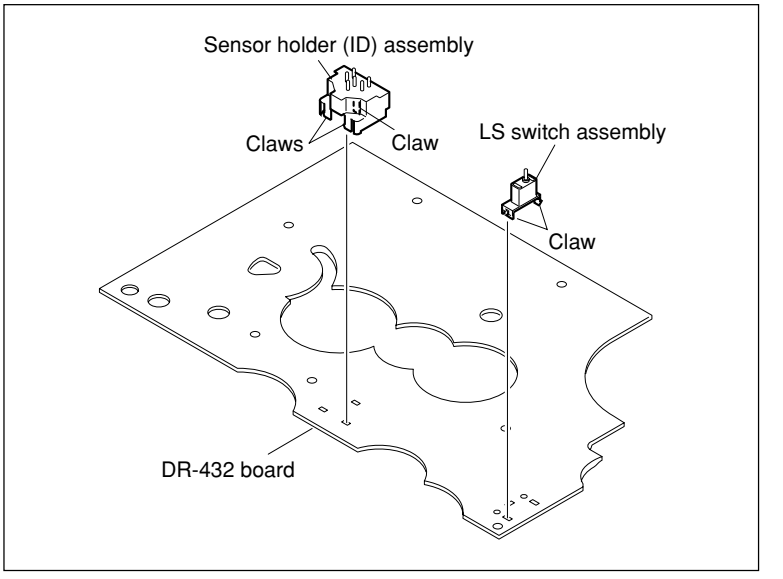
2. Disconnect the ten harnesses from the connectors (CN1, CN2, CN3, CN4, CN6, CN7, CN200, CN400, CN410, and CN413) on the DR-432 board and the two flat cables from the connectors (CN201 and CN202).



3. Remove the two screws (PWH2 × 5) and remove the reinforcement plate.
4. Remove the seven screws and remove the DR-432 board.



5. Remove the LS switch assembly and the sensor holder (ID) assembly from the DR-432 board.



Installation Procedure

1. Implement installation by reversing the steps of removal.

   Notes

   - When fixing the DR-432 board, be careful that the harnesses and the flat cables must not be pinched.
   - Tightening torque when fixing the DR-432 board and reinforcement plate : 20×10^{-2} N•m {2 kgf•cm}

2. After installing the cassette compartment assembly, implement the setup that is required after replacement.
   (Refer to Section 1-20-4.)

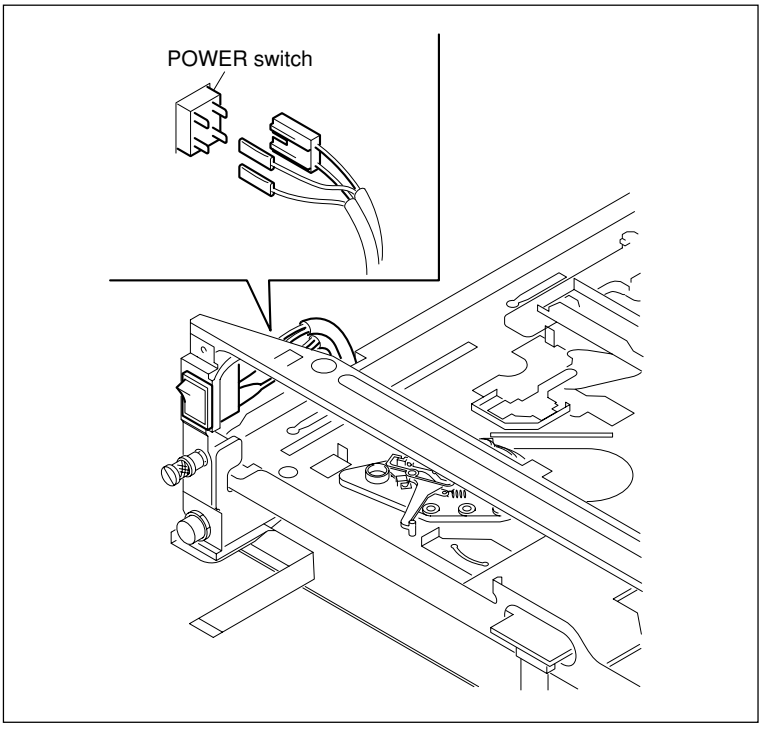
5-23-5. HP-107 Board

Preparation

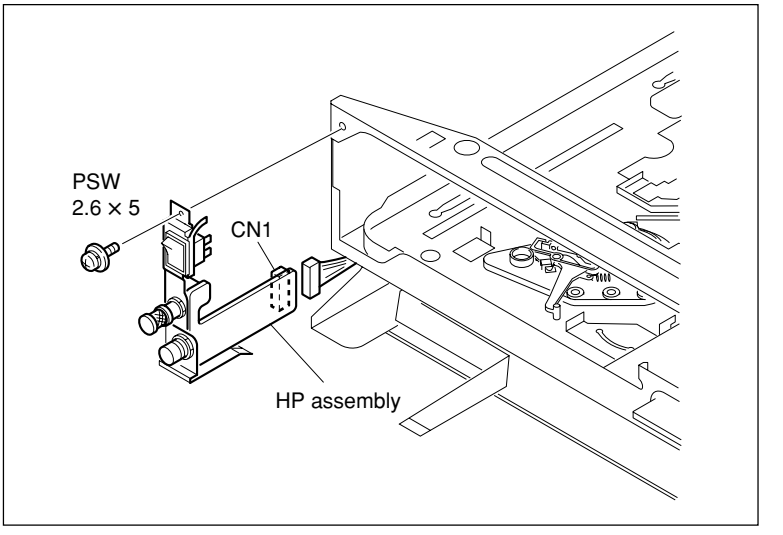
1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the front panel assembly. (Refer to Section 1-4-3.)

Removal Procedure

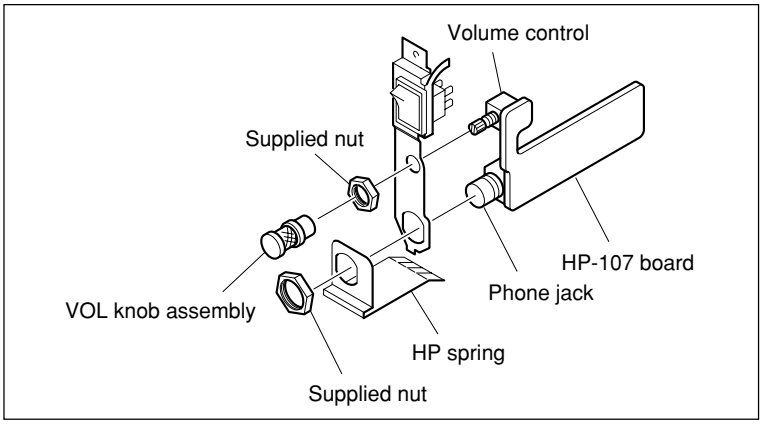
1. Disconnect the harness from the POWER switch.



2. Remove the screw and HP assembly.
3. Disconnect the harness from the connector (CN1) on the HP-107 board.



4. Remove the VOL knob assembly from the volume control (LEVEL).
5. Remove the supplied nut that fixes the volume control (LEVEL).
6. Remove the supplied nut that fixes the phone jack and remove the HP-107 board.



Installation Procedure

1. Implement installation by reversing the steps of removal.

   Note

   Do not forget to attach the HP spring.

2. After installing the front panel assembly, implement the setup that is required after replacement. (Refer to Section 1-20-5.)

5-23-6. IF-808/826 Board

Note

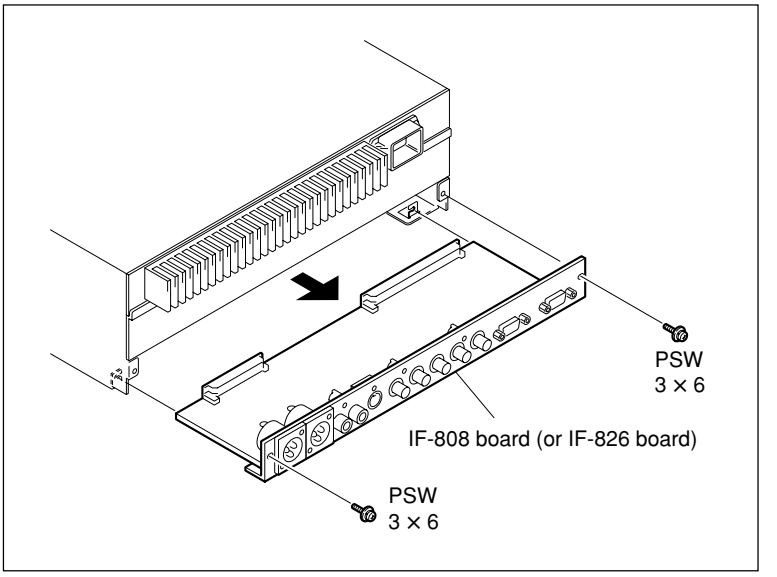
The illustration shows the example when the IF-808 board is used.
IF-808 board : J-1/901, J-2/901, J-3/901
IF-826 board : J-1/902, J-2/902, J-3/902

Preparation

1. Turn off the POWER switch and disconnect the AC power cord.

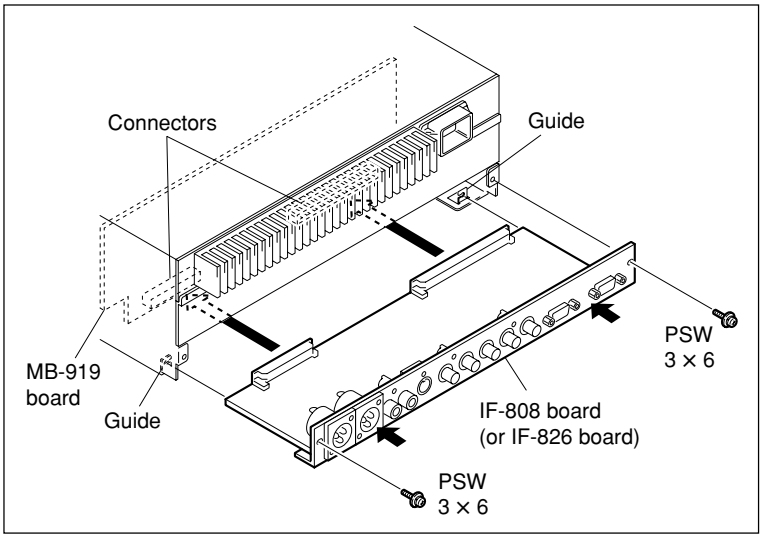
Removal Procedure

1. Remove the two screws (PSW3 × 6).
2. Pull the IF-808 board (or IF-826 board) out from the slot in the direction of the arrow.



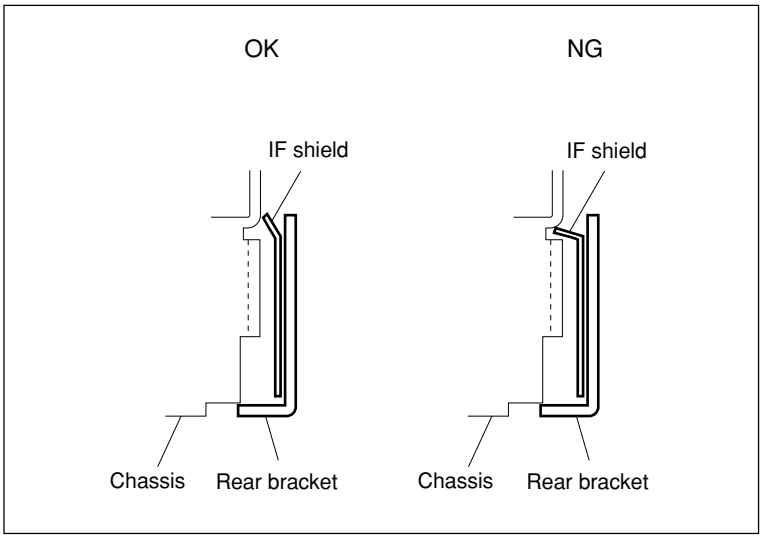
Installation Procedure

1. Insert the IF-808 board (or IF-826 board) along with the guides.



Note

Be careful that the IF shield must not be bent inside the chassis.



2. Strongly push the connector panel both from the right and the left sides so that the connectors on the IF-808 board (or IF-826 board) are securely inserted into the connectors on the MB-919 board.

   Note

   Be careful that the main unit does not move during this work.

3. Fix the IF-808 board (or IF-826 board) with the two screws.
4. Implement the setup that is required after replacement.
   (Refer to Section 1-20-6 or 1-20-7.)

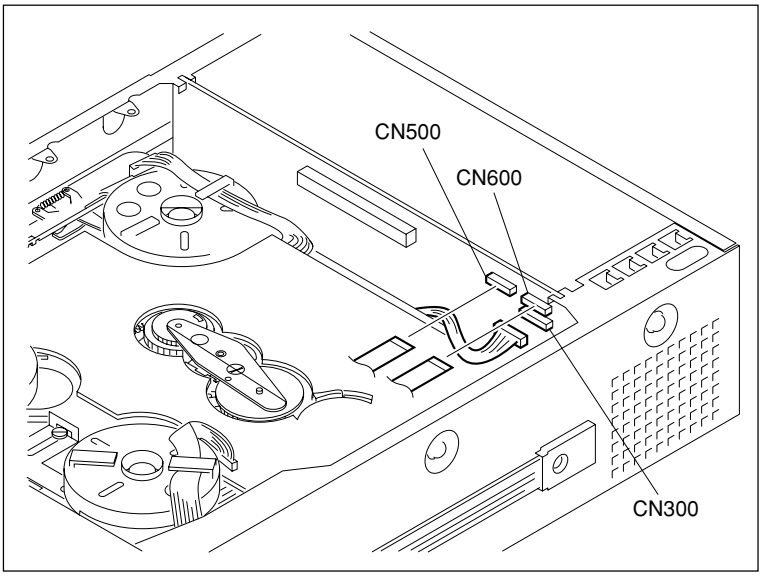
5-23-7. MB-919 Board

Preparation

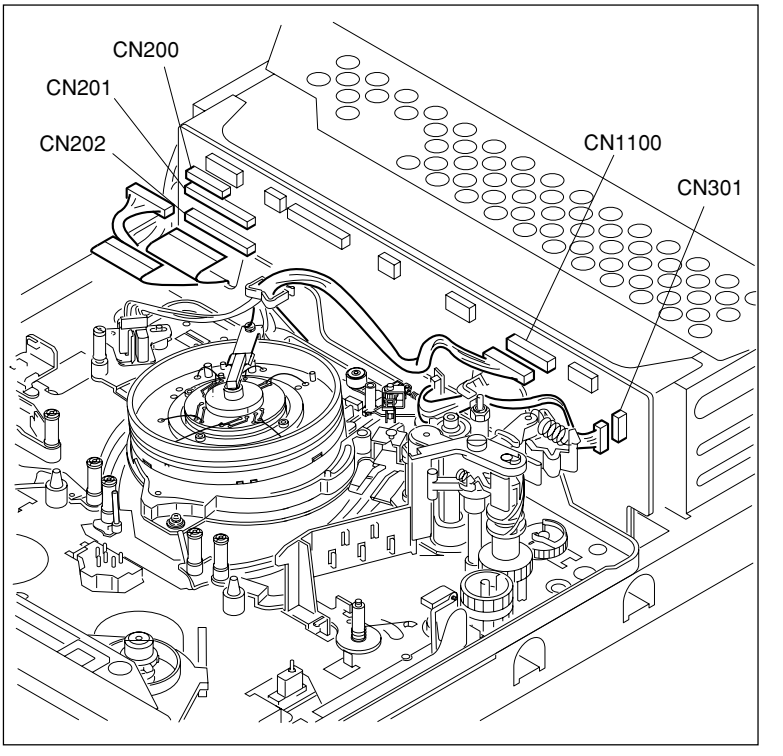
1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)
4. Remove the bottom panel assembly. (Refer to Section 1-4-2.)

Removal Procedure

1. Remove the DM-124 board. (Refer to Section 5-23-2.)
2. Disconnect the two flat cables from the connectors (CN500 and CN600) on the MB-919 board.
3. Disconnect the harness from the connector (CN300) on the MB-919 board.



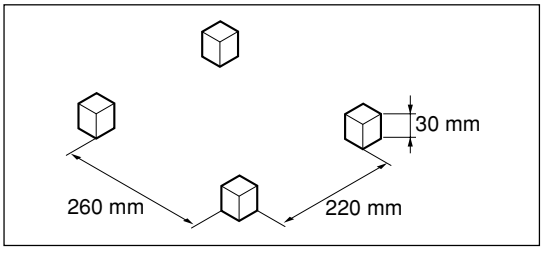
4. Disconnect the three harnesses from the connectors (CN200, CN301, and CN1100) on the MB-919 board.
5. Disconnect the two flat cables from the connectors (CN201 and CN202) on the MB-919 board.
6. Remove the bracket DPR assembly and DPR-172 board. (Refer to Section 5-23-3.)
7. Remove the power assembly. (Refer to Section 5-22.)
8. Remove the IF-808 board (or IF-826 board). (Refer to Section 5-23-6.)

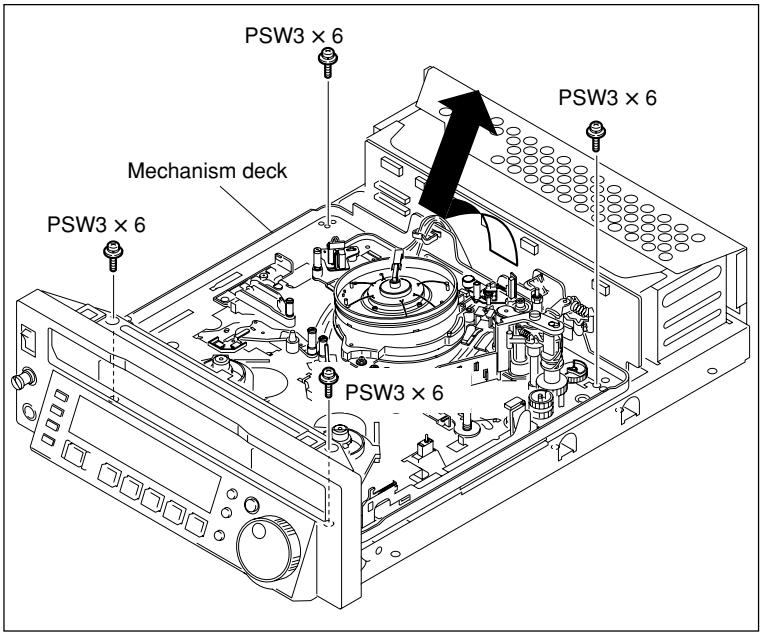


9. Remove the four screws and remove the mechanism deck from the drum side in the direction of the arrow.

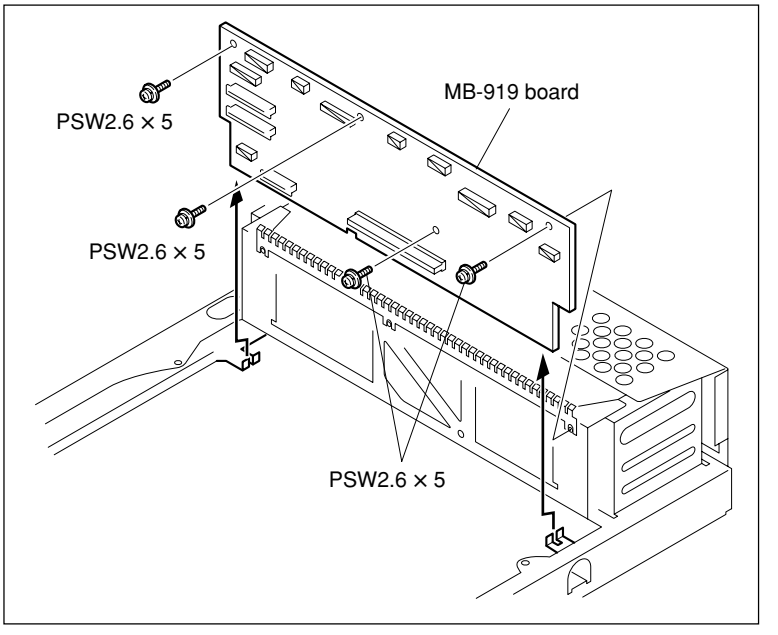
Note

Place the removed mechanism deck on a worktable as shown below that is supported by the studs.
If the mechanism deck is placed directly on any place other than the worktable, the rotor blocks of the capstan motor and reel motors will attract metallic piece and the motor will not work.
If the mechanism deck is placed on any place other than the worktable, clean the outside of the rotor with the cleaning cloth moistened with the cleaning fluid.





10. Remove the four screws and remove the MB-919 board in the direction of the arrow.



Installation Procedure

1. Implement installation by reversing the steps of removal.

Note

When install the mechanism deck, be careful never pinch the flat cable or harness.

2. After installing the cassette compartment assembly, implement the setup that is required after replacement.
(Refer to Section 1-20-8.)

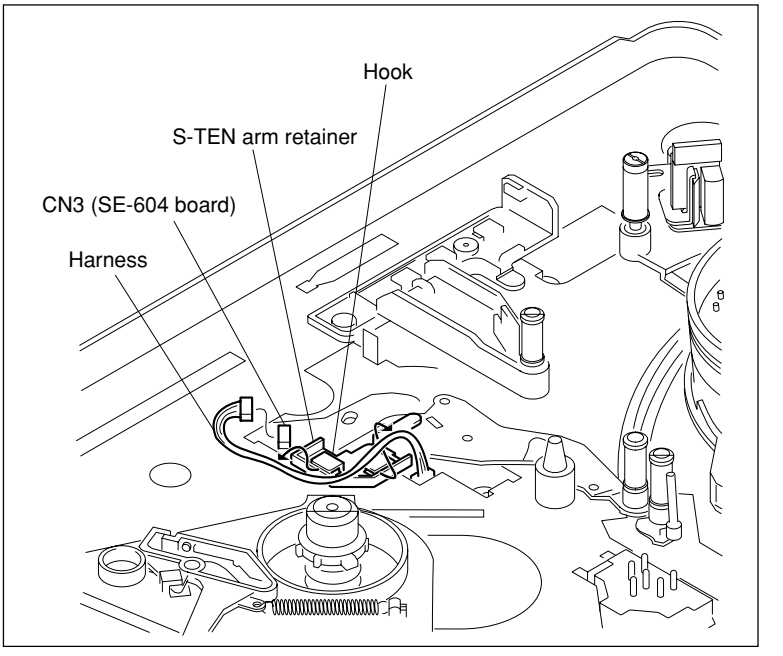
5-23-8. SE-604 Board

Preparation

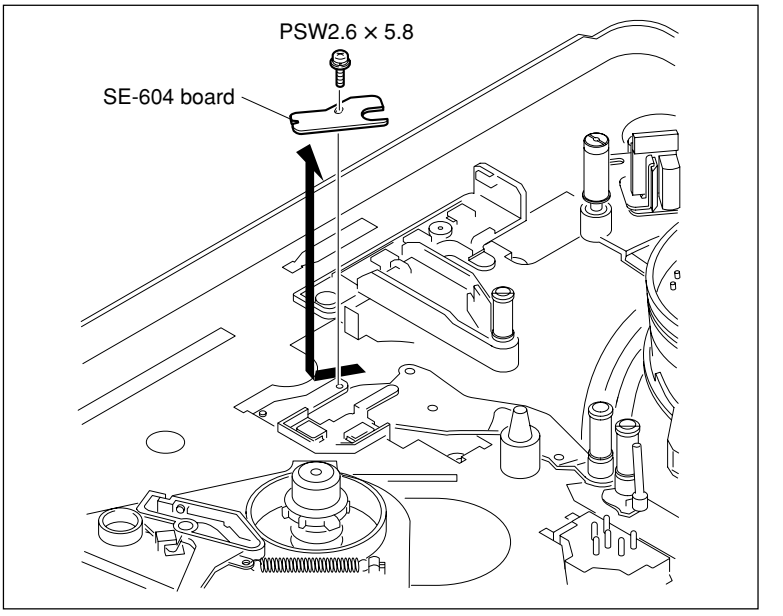
1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)

Removal Procedure

1. Remove the harness from the hook of the S-TEN arm retainer and disconnect it from the connector (CN3) on the SE-604 board.



2. Remove the screw and remove the SE-604 board in the direction of the arrow.



Installation Procedure

1. Implement installation by reversing the steps of removal.
2. After installing the cassette compartment assembly, perform the Tension Regulator Adjustment. (Refer to Section 5-13-2.)

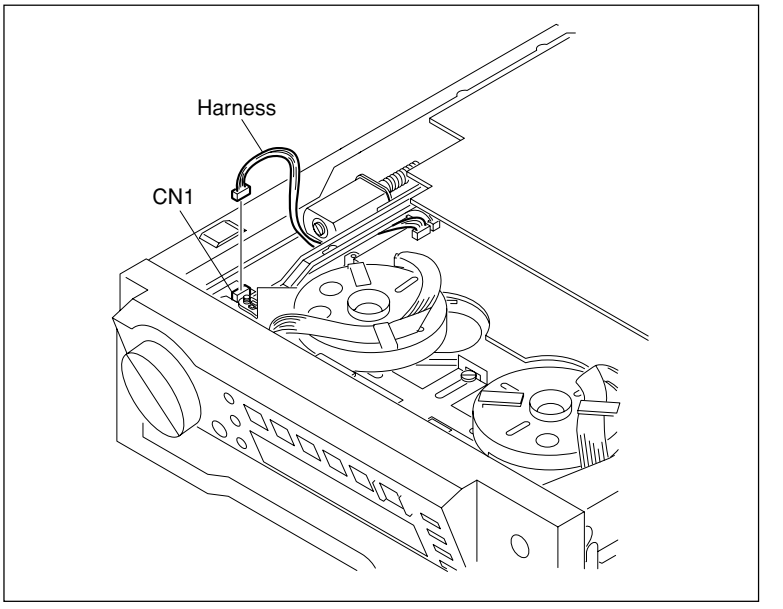
5-23-9. SE-605 Board

Preparation

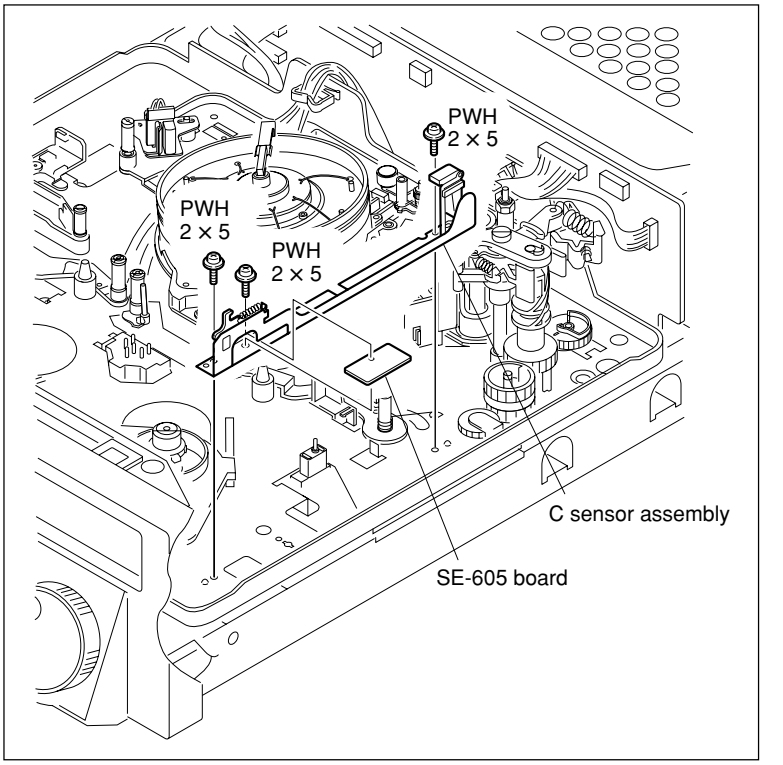
1. Turn off the POWER switch and disconnect the AC power cord.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Remove the cassette compartment assembly. (Refer to Section 1-5.)
4. Remove the bottom panel assembly. (Refer to Section 1-4-2.)

Removal Procedure

1. Disconnect the harness from the connector (CN1) on the SE-605 board.



2. Remove the two screws and remove the C sensor assembly.
3. Remove the screw and remove the SE-605 board in the direction of the arrow.



Installation Procedure

1. Implement installation by reversing the steps of removal.
2. After installing the cassette compartment assembly, implement the setup that is required after replacement.
   (Refer to Section 1-20-10.)

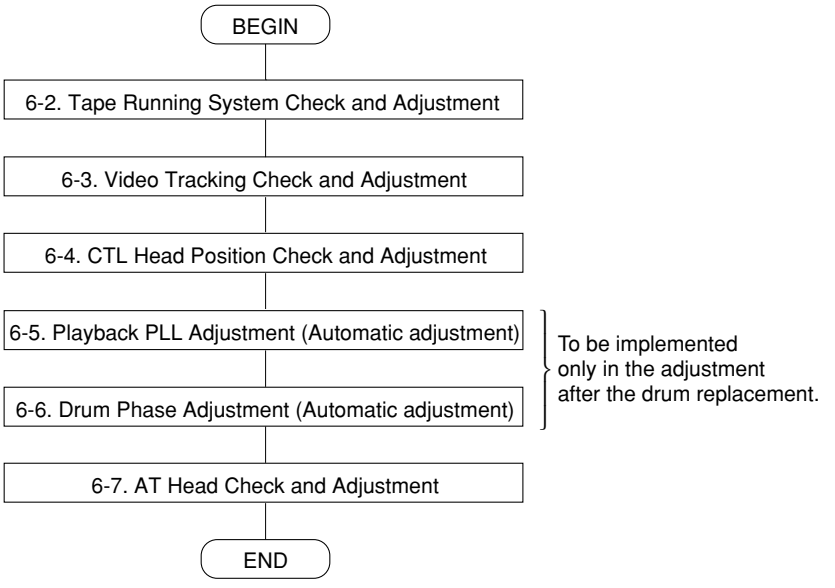
Section 6
Tape Running System Adjustment

This section describes the check and adjustment procedures of the mechanical parts consisting the tape running system for their installation position, height, and inclination.

6-1. General Information for Tape Running System Adjustment

The basic information such as preparations and preliminary knowledge required to perform the checks and adjustments that are described in this section, are described as follows.

6-1-1. Adjustment Flow

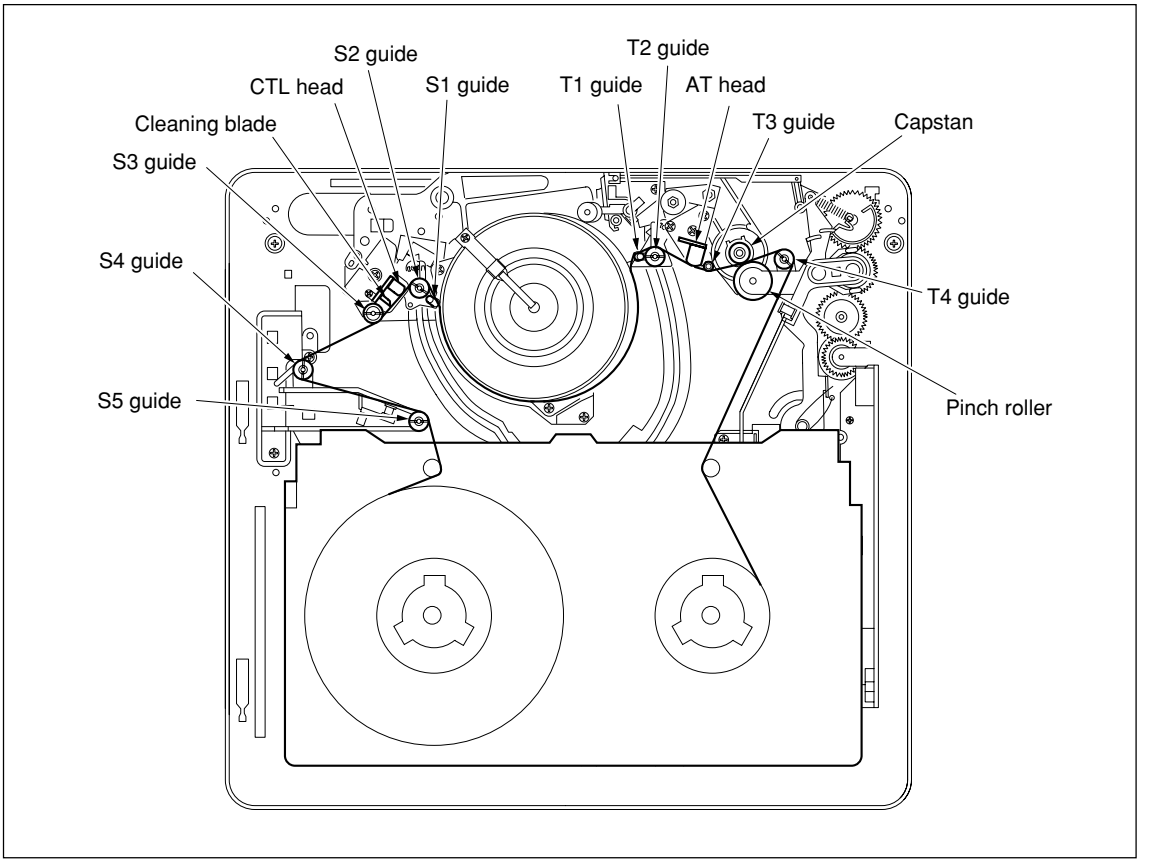

BEGIN
6-2. Tape Running System Check and Adjustment
6-3. Video Tracking Check and Adjustment
6-4. CTL Head Position Check and Adjustment
6-5. Playback PLL Adjustment (Automatic adjustment)
6-6. Drum Phase Adjustment (Automatic adjustment)
To be implemented only in the adjustment after the drum replacement.
6-7. AT Head Check and Adjustment
END

6-1-2. Notes

(1) Perform the tape running system adjustment of this unit with the cassette compartment kept installed.
(2) Prepare the alignment tape that matches the mode (525 or 625) of your unit and use it for the tape running system adjustment.
(3) The mechanical components of the tape running system, consist of the precision parts and are exactly adjusted when shipped from the factory. Never touch nor turn the screws other than the specified screws.
If any screw other than the specified screws is turned, the correct tape running system adjustment cannot be performed that results in defective tape running performance.
If any screw other than the specified screws is turned, replacement of the mechanical block may be needed.

6-1-3. Identifying the Components of the Tape Running System

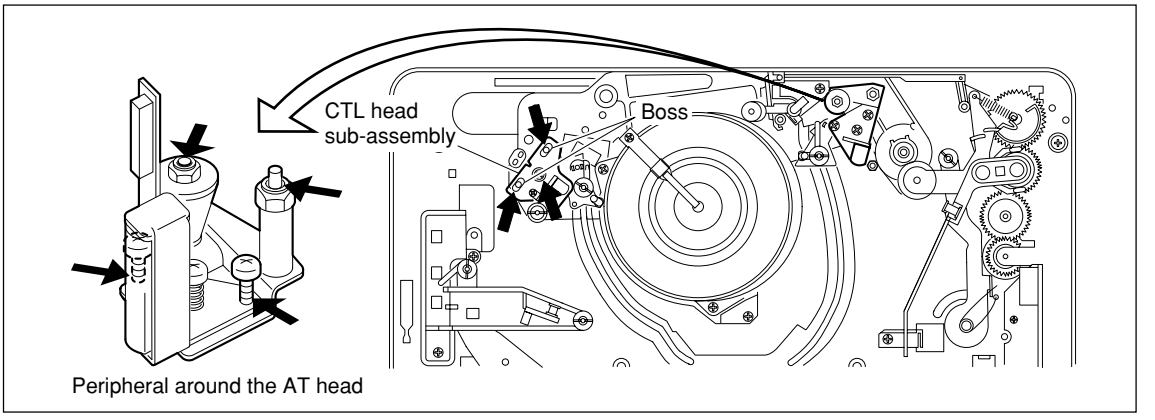
The components that are related to the tape running system are shown in the illustration below with their names.
The illustration shows the tape running system after it enters the threading-end state.



6-1-4. Applying the Locking Compound

If any of the following screws is loosened for adjustment or if the CTL head sub-assembly is moved for adjustment, coat the respective screws and bosses with the locking compound.
Be sure to wipe off the extra locking compound coming out from the screws or boss with cloth such as gauze.

• Locking compound : 7-432-114-11



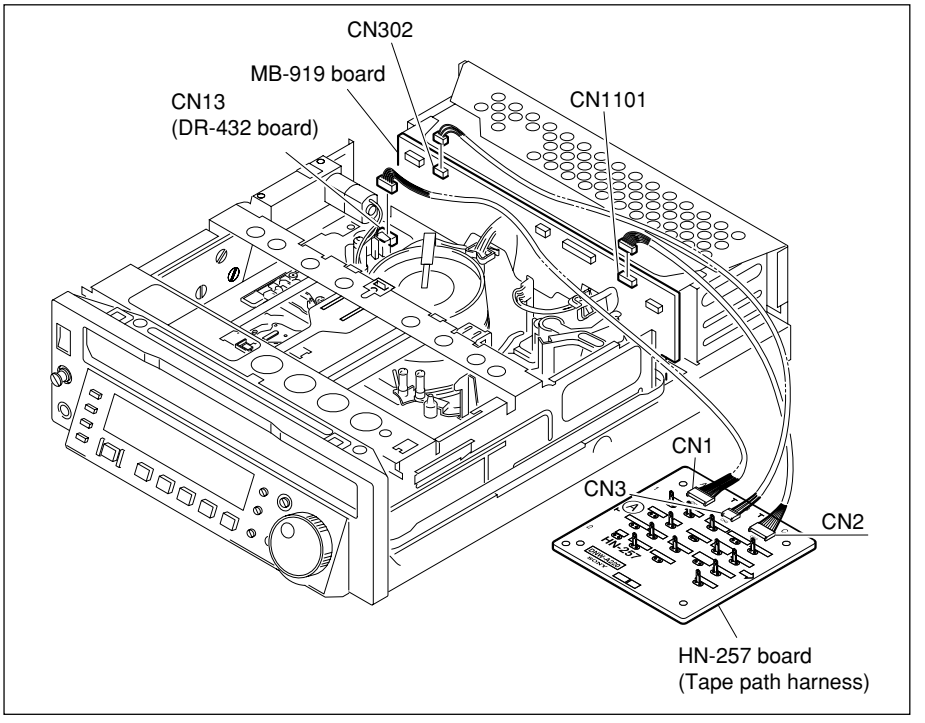
6-1-5. Connecting the HN-257 Board (Tape Path Harness)

Notes

- Do not place the HN-257 board directly on the metallic worktable. The correct signal waveform may not be obtained.
- Place the unit on a level and flat worktable.

Method of connecting the HN-257 board (tape path harness)

1. Turn off the power switch.
2. Remove the top panel assembly. (Refer to Section 1-4-1.)
3. Connect the harness coming from CN3 of the HN-257 board to the connector CN302 on the MB-919 board.
4. Connect the harness coming from CN2 of the HN-257 board to the connector CN1101 on the MB-919 board.
5. Connect the harness coming from CN1 of the HN-257 board to the connector CN13 on the DR-432 board.



6-1-6. Preparations

(1) Remove the VH cleaner assembly. (Refer to Section 5-4.)

Note

If the VH cleaner assembly is left in the unit, tape curl at the T2 guide cannot be checked easily. It is recommended that you remove the VH cleaner assembly beforehand for the visual check.

(2) Perform cleaning of the following portions.

- Upper drum tape running surface and video heads (Refer to Section 4-2-3.)
- Lower drum tape running surface and rabbet guide (Refer to Section 4-2-4.)
- Stationary heads (Refer to Section 4-2-5.)
- Tape running system and cleaning blade (Refer to Section 4-2-6.)

6-2. Tape Running System Check and Adjustment

Tools and Measuring Equipment

- "L" size Betacam SX cassette tape BCT-184MLSX
  (Commercially available on market)
- Mirror (small oval type) : J-6080-840-A
- Tape guide adjustment screwdriver : J-6082-044-A
  or J-6080-811-A
- Nut driver (for cross : 5.5 mm) : 7-700-751-02

Check Procedure

1. Inserting the "L" cassette tape

(1) Turn on the main power.
(2) Insert the "L" cassette.

Note

Rewind the cassette tape beforehand.

2. Checking the tape running system in the PLAY mode

(1) Press the PLAY button so that the unit enters the PLAY mode.
(2) Check that the tape runs while satisfying the specification 1.

If the specification 1 is not satisfied, perform step 8.

3. Checking the tape running system in the REV × 1 mode

(1) Press the PLAY button and then rotate the JOG dial to enter the REV × 1 mode.
(2) Check that the tape runs while satisfying specification 2 after the modes are switched.

If the specification 2 is not satisfied, perform steps 8 and 9.

4. Checking the tape running system in the F.FWD mode

(1) Press the F FWD button so that the unit enters the F.FWD mode.
(2) Check that the tape runs while satisfying the specification 1.

5. Checking the tape running system in the REV × 2 mode (when mode is switched from F.FWD to REV × 2)

(1) Press the F FWD button and then rotate the JOG dial to enter the REV × 2 mode.
(2) Check that the tape runs while satisfying specification 2 after the modes are switched.

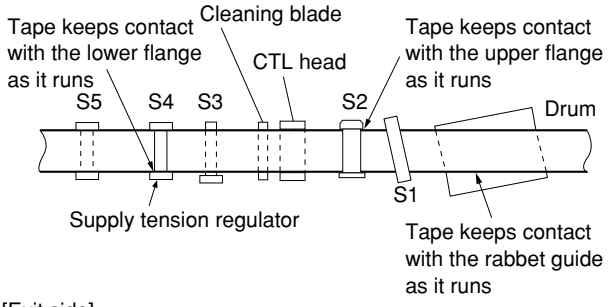
6. Checking the tape running system in the REW mode

(1) Press the REW button to enter the REW mode.
(2) Check that the tape runs while satisfying the specification 1.

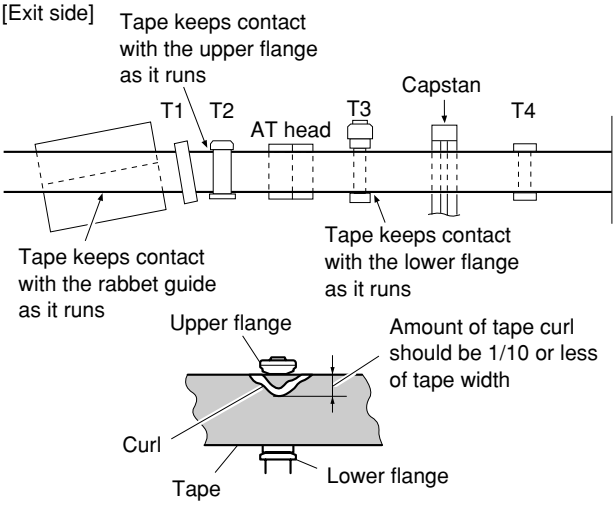
7. Checking the tape running system in the FWD × 2 mode (when mode is switched from REW to FWD × 2)

(1) Press the REW button and then rotate the JOG dial to enter the FWD × 2 mode.
(2) Check that the tape runs while satisfying specification 2 after the modes are switched.

[Entrance side]



[Exit side]

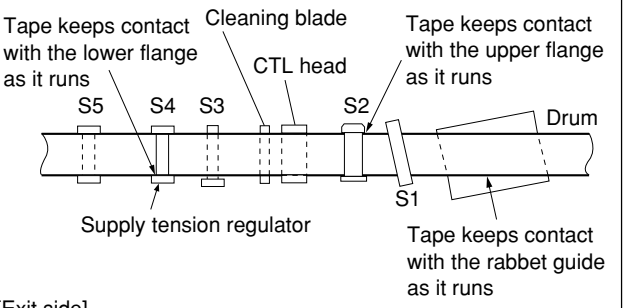


Specification 1 :

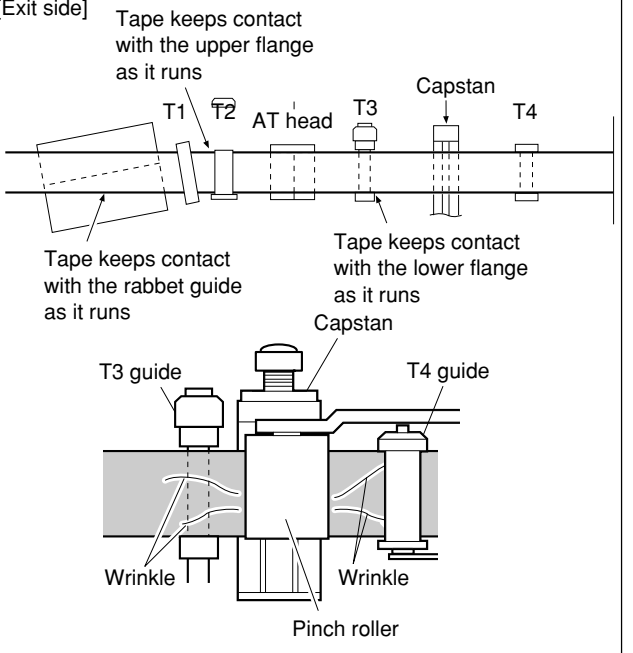
< Drum entrance side >
- S2 guide
  Tape should run while keeping contact with the upper flange. Amount of tape curl should be 1/10 or less of tape width.
- S3 guide
  Tape should not contact the lower flange. Clearance between tape and the lower flange should be 0.2 mm or less.
- S4 (S tension regulator) guide
  Tape should run while keeping contact with the lower flange. Amount of tape curl should be 1/10 or less of tape width.
- S5 guide
  Amount of tape curl should be 1/10 or less of tape width.
- Rabbet guide at the drum entrance side
  Tape should run along with the rabbet guide. Then there should not exit any tape curl, and tape should not float from the rabbet guide.

< Drum exit side >
- T2 guide
  Tape should run while keeping contact with the upper flange. Amount of tape curl should be 1/10 or less of tape width.
- T3 guide
  Tape should run while keeping contact with the lower flange. Amount of tape curl should be 1/10 or less of tape width.
- T4 guide
  Amount of tape curl should be 1/10 or less of tape width.
- Rabbet guide at the drum exit side
  Tape should run along with the rabbed guide. Then there should not exit any tape curl, and tape should not float from the rabbet guide.
- Capstan
  Tape wrinkle due to pinch pressure should not occur before and after the capstan.

[Entrance side]



[Exit side]



Specification 2 :

< Drum entrance side >
- S2 to S5 guides
  Tape curl should not occur.

< Drum exit side >
- T2 to T4 guides
  Tape curl should not occur.
- Capstan
  Tape wrinkle due to pinch pressure should not occur before and after the capstan. Tape wrinkle should disappear in 1.5 seconds and the tape should not receive any damage even if tape wrinkle is generated.

Adjustment Procedure

8. Tape guide height adjustment

(1) If tape curl occurs at guide flange, adjust height of the respective tape guides by turning their upper flange (other than T3) or their height adjustment nut (only T3) so that the tape curl does not occur.

Note

Because the S4 (S tension regulator) guide is precisely adjusted when shipped from the factory, do not turn it more than 90 degrees. If tape curl occurs at the S4 guide, inclination of the S4 guide is suspected to be defective. Replace the S4 guide assembly.

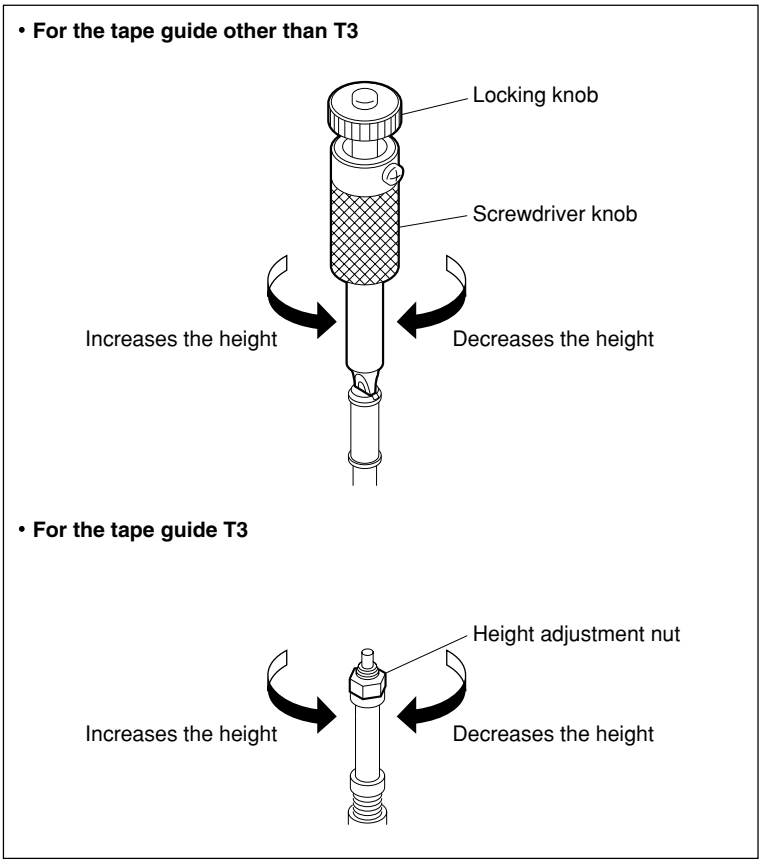
(2) If tape wrinkle due to pinch roller pressure is generated before and after the capstan (during REV mode), adjust the T4 guide flange height so that tape lightly contacts the T3 guide lower flange in both of the PLAY and REV modes.

(3) If tape cannot contact the S2 guide upper flange when it runs in the PLAY mode, rotate the S4 guide upper flange counter-clockwise by 90 degrees.
If the above adjustment does not solve the problem, replace either the shuttle S block assembly or the S4 guide assembly.

Note

Because the S4 (S tension regulator) guide is precisely adjusted when shipped from the factory, do not turn it more than 90 degrees.

(4) If tape cannot contact the T2 guide upper flange when it runs in the PLAY mode, check if zenith of the AT head is perpendicular or not. If it does not solve the problem, replace the shuttle T block assembly.



9. Re-checking the tape running

Perform the above steps 1 to 7 to re-check that the tape running statuses satisfy the respective specifications.
If the specification 1 or 2 is not satisfied as the result of re-check, repeat step 8 again.

When the Adjustment is Performed

10. Perform all of Sections 6-3 and higher.

6-3. Video Tracking Check and Adjustment

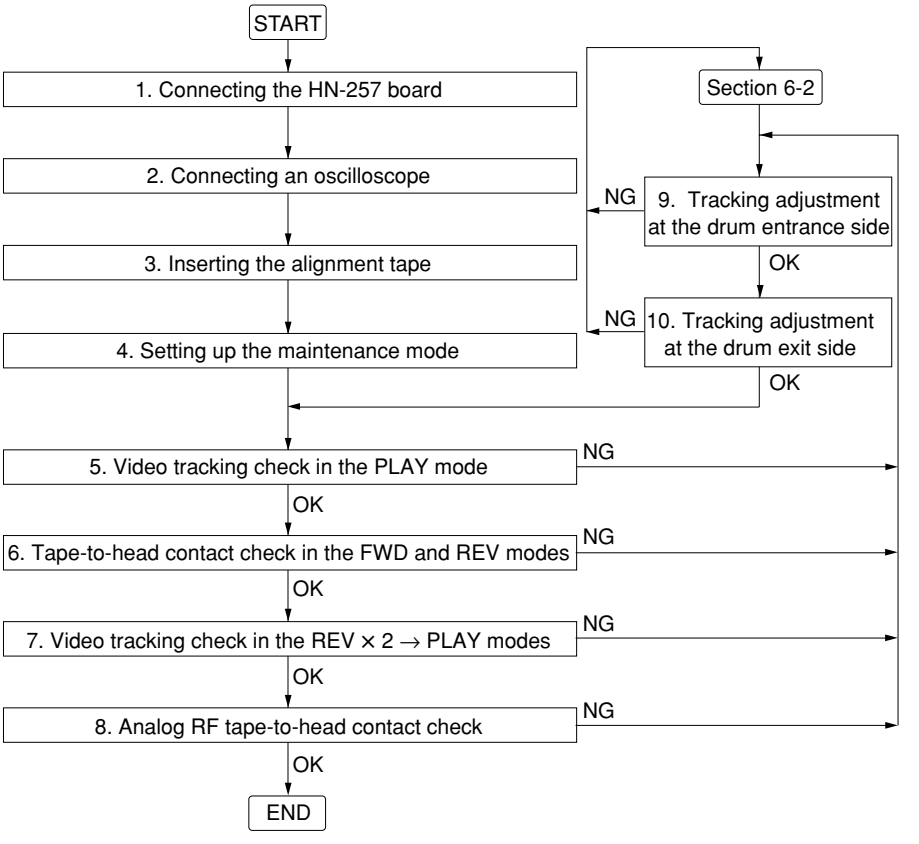
Note

The RF envelope waveform (during the PLAY mode) needs to be flat in the video tracking check. However, the RF envelope waveform is not always flat. Such RF envelope waveform will not cause any problem if it satisfies the specification even though it is not flat. Perform the following adjustments only when the RF envelope waveform does not satisfy the specification.

Tools and Measuring Equipment

- Alignment tape SR2-1 : 8-960-075-11 (J-1)
  or SR2-1P : 8-960-075-61 (J-1)
- Alignment tape MR2-1P : 8-960-077-61 (J-2/J-3)
- Alignment tape CR2-1B : 8-960-096-01
  or CR2-1B PS : 8-960-096-51
- Oscilloscope (TEKTRONIX TDS460A or equivalent)
- Mirror (small oval type) : J-6080-840-A
- Tape guide adjustment screwdriver : J-6082-044-A
  or J-6080-811-A
- HN-257 board : A-8317-304-A
- Screwdrivers for adjustment
- Analog composite video monitor for menu display

Video Tracking Check and Adjustment Flow


START
1. Connecting the HN-257 board
2. Connecting an oscilloscope
3. Inserting the alignment tape
4. Setting up the maintenance mode
5. Video tracking check in the PLAY mode
6. Tape-to-head contact check in the FWD and REV modes
7. Video tracking check in the REV × 2 → PLAY modes
8. Analog RF tape-to-head contact check
END
Section 6-2
9. Tracking adjustment at the drum entrance side
10. Tracking adjustment at the drum exit side
NG
OK

Setting

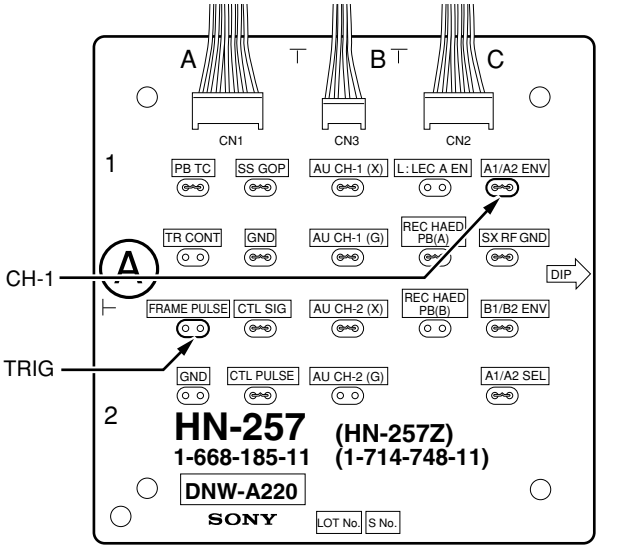
1. Connecting the HN-257 board (Tape path harness)

(Refer to Section 6-1-5.)

2. Connecting an oscilloscope.

Connect an oscilloscope to the following points. (See the illustration in the right.)
CH-1 : A1/A2 ENV/HN-257 board
TRIG : FRAME_PULSE/HN-257 board
Set an oscilloscope as follows.
CH-1 : 200 mV/DIV
TRIG : 100 mV/DIV
TIME : 2 ms/DIV

• **Connecting an oscilloscope**



3. Inserting the alignment tape

(1) Turn on the main power.
(2) Insert the alignment tape.
J-1 : SR2-1 (or SR2-1P)
J-2 : MR2-1P
J-3 : MR2-1P

4. Setting up the maintenance mode

(1) Start up the maintenance mode.
(2) Enter A50 : PATH MODE SELECT.
Maintenance mode → M1 : ADJUST → A5 : MECHANISM ADJUST → A50 : PATH MODE SELECT
(3) When the SET button is pressed again, a white square mark appears in the top right of video monitor display.

Note

Refer to Section 3 for details of the maintenance mode.

5. Video tracking check in the PLAY mode

(1) Play back the alignment tape (00 : 00 to 15 : 00).
J-1 : SR2-1 (or SR2-1P)
J-2 : MR2-1P
J-3 : MR2-1P

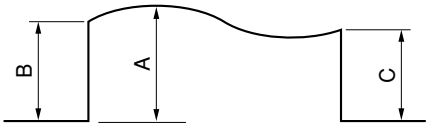
(2) Press the MENU (SHIFT + SET) button once to exit the mode.
(3) Rotate the JOG dial (or SHUTTLE ring) to move the cursor (∗) to "VOL200".
(4) While pressing the CTL/TC/UB button, rotate the JOG dial (or SHUTTLE ring) to adjust the RF envelope waveform until center of the RF envelope waveform (CH1) is maximized.
Then rotate the JOG dial until amplitude become 80% of the maximum amplitude.
(5) Press SET button.
(6) Check that the RF envelope waveform satisfies specification 1.

Note

When the RF envelope waveform fluctuates, take reading of the average value.

If the specification 1 is not satisfied, perform the adjustments (drum entrance side or exit side adjustment) as shown in step 9 and higher.

• Alignment tape : SR2-1/SR2-1P/MR2-1P (00 : 00 to 15 : 00)



Specification 1: The entire waveform should maintain the amplitude of 80 % or more of its maximum amplitude A.

$\frac{B}{A} \times 100 \geqq 80\ \%$, $\frac{C}{A} \times 100 \geqq 80\ \%$

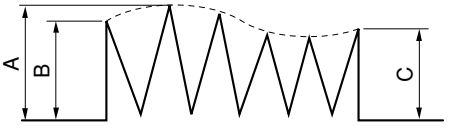
6. Tape-to-head contact check in the FWD and REV modes

(1) Play back the alignment tape (00 : 00 to 15 : 00).
J-1 : SR2-1 (or SR2-1P)
J-2 : MR2-1P
J-3 : MR2-1P

(2) Establish the FWD × 35 mode and check that the RF envelope waveform satisfies the specification 2.
(3) Establish the REV × 35 mode and check that the RF envelope waveform satisfies the specification 2.

If the specification 2 is not satisfied, perform the adjustments (drum entrance side or exit side adjustment) as shown in step 9 and higher.

• Alignment tape : SR2-1/SR2-1P/MR2-1P (00 : 00 to 15 : 00)



Specification 2 : $\frac{B}{A} \times 100 \geqq 80\ \%$, $\frac{C}{A} \times 100 \geqq 80\ \%$

7. Video tracking check in the REV × 2 → PLAY modes

(1) Connect an oscilloscope to the following points. (See the illustration in the right.)
CH-1 : A1/A2 ENV/HN-257 board
CH-2 : CTL PULSE/HN-257 board
TRIG : FRAME_PULSE/HN-257 board
Set an oscilloscope as follows.
CH-1 : 500 mV/DIV
CH-2 : 5 V/DIV
TRIG : 100 mV/DIV
TIME : 1 ms/DIV

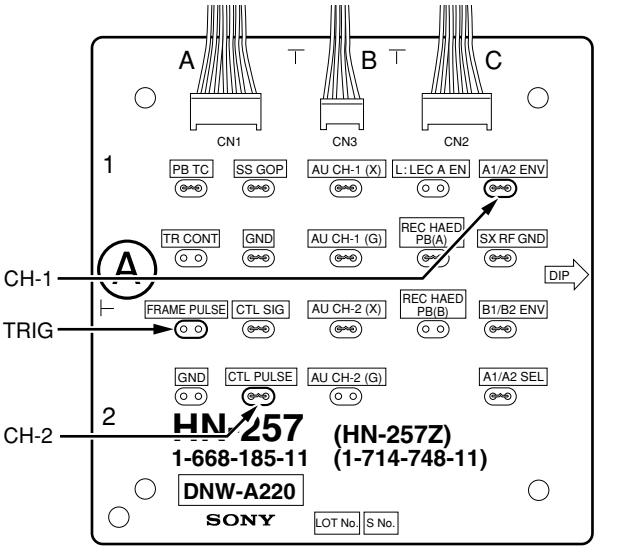
(2) Play back the alignment tape (00 : 00 to 15 : 00).
J-1 : SR2-1 (or SR2-1P)
J-2 : MR2-1P
J-3 : MR2-1P

(3) Establish the REV × 2 mode. After the tape speed reaches the constant speed, enter the PLAY mode.
Check that the beginning and the end of the RF envelope waveform amplitude rise up by equal amplitude and then the RF envelope waveform amplitude returns to the original amplitude within one second after the CH-2 CTL waveform becomes stationary. (Specification 3)

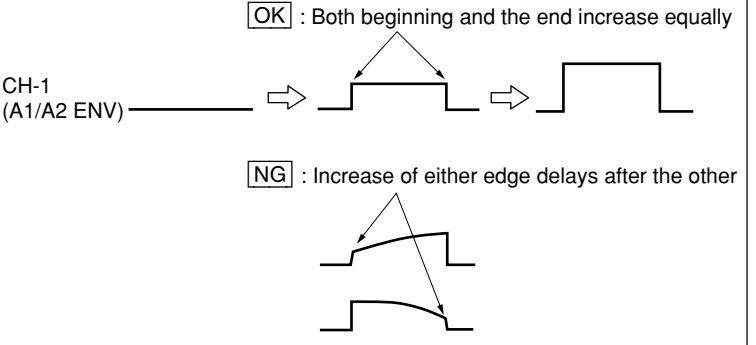
(4) Repeat step (3) three times. Check that the specification 3 is satisfied every time.

If the specification 3 is not satisfied, perform the adjustments (drum entrance side or exit side adjustment) as shown in step 9 and higher.

• Connecting an oscilloscope



• Alignment tape : SR2-1/SR2-1P/MR2-1P (00 : 00 to 15 : 00)



Specification 3 :
- Both beginning and the end of the waveform increase equally.
- Waveform restores its original waveform within one second.

8. Analog RF tape-to-head contact check

(1) Connect an oscilloscope to the following points. (See the illustration in the right.)
CH-1 : TP101/DM-124 board (Y-RF signal)
CH-2 : TP301/DM-124 board (C-RF signal)
TRIG : TP901/DM-124 board (SWP signal)
GND : E104/DM-124 board
Set an oscilloscope as follows.
CH-1 : 100 mV/DIV
TRIG : 500 mV/DIV

Note

An oscilloscope probe can be connected to the respective TP (test points) through the holes on the left side chassis of the machine.

(2) Press the EJECT button and eject the alignment tape.
(3) Insert the CR2-1B (or CR2-1B PS).
(4) Press the PLAY button and play back the CR2-1B (or CR2-1B PS).
(5) While pressing the CTL/TC/UB button, rotate the JOG dial (or SHUTTLE ring) to adjust the RF envelope waveform until the maximum RF envelope waveform is obtained.
(6) In the mechanical statue of step (5), check that the Y-RF envelope waveform satisfies the specification 4.

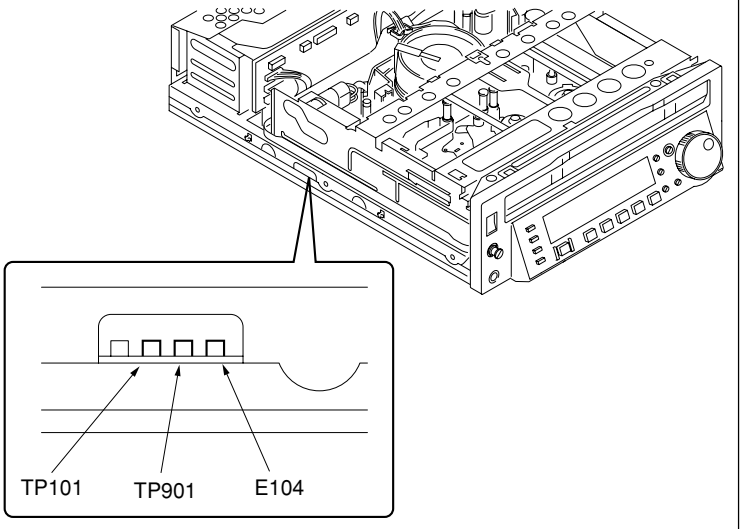
If the specification is not satisfied, perform the adjustment step 9 and higher.

(7) While pressing the CTL/TC/UB button, rotate the JOG dial (or SHUTTLE ring) so that the center of the Y-RF envelope waveform has the amplitude of 70% with respect to the maximum amplitude of the waveform.
(8) In the mechanical statue of step (7), check that the Y-RF envelope waveform satisfies the specification 5.

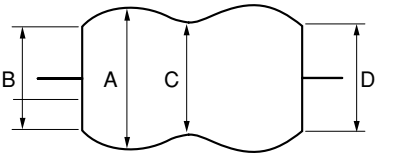
If the specification is not satisfied, perform the adjustment step 9 and higher.

• Connecting an oscilloscope

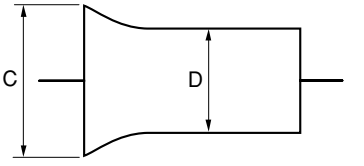
CH-1 : TP101/DM-124 (Y-RF signal)
CH-2 : TP301/DM-124 (C-RF signal)
TRIG : TP901/DM-124 (SWP signal)



• Alignment tape : CR2-1B



Specification 4 : $\frac{B}{A} \times 100 \geqq 85\ \%$, $\frac{C}{A} \times 100 \geqq 85\ \%$, $\frac{D}{A} \times 100 \geqq 85\ \%$



Specification 5 : $\frac{C}{D} \times 100 = 110 \pm 7.5\ \%$

Adjustment Procedure

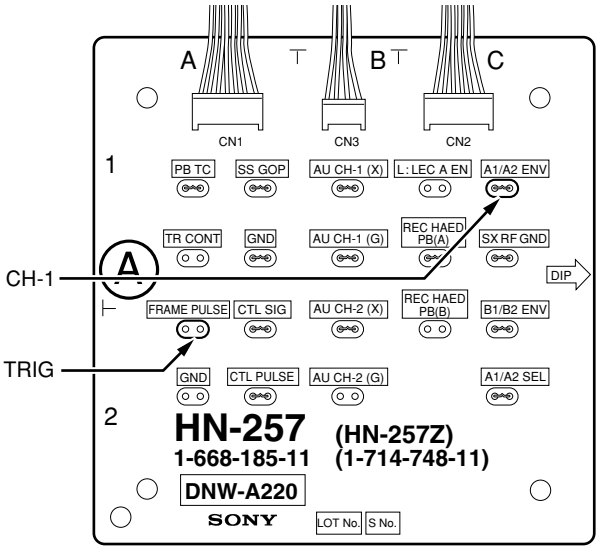
9. Tracking adjustment at the drum entrance side

(1) Set up the specified mode. (Refer to step 4.)
(2) Connect an oscilloscope to the following points. (See the illustration in the right.)
CH-1 : A1/A2 ENV/HN-257 board
TRIG : FRAME_PULSE/HN-257 board
Set an oscilloscope as follows.
CH-1 : 200 mV/DIV
TRIG : 100 mV/DIV
TIME : 2 ms/DIV
(3) Play back the alignment tape (00 : 00 to 15 : 00).
J-1 : SR2-1 (or SR2-1P)
J-2 : MR2-1P
J-3 : MR2-1P
(4) While pressing the CTL/TC/UB button, rotate the JOG dial (or SHUTTLE ring) to adjust the RF envelope waveform until the maximum RF envelope waveform is obtained.
(5) While pressing the CTL/TC/UB button, rotate the JOG dial (or SHUTTLE ring) so that the center of the RF envelope waveform has the amplitude of 80% with respect to the maximum amplitude of the waveform.
(6) Adjust height of the S2 guide upper flange until the RF envelope waveform satisfies the specification 6.
If the specification 6 is not satisfied, perform the “Tape Running System Check and Adjustment” (Refer to Section 6-2.) and “Video Tracking Check and Adjustment” (this Section).

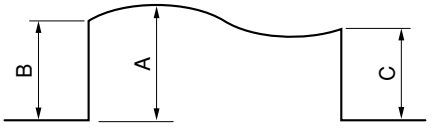
10. Tracking adjustment at the drum exit side

(1) Set up the specified mode. (Refer to step 4.)
(2) Connect an oscilloscope to the following points. (See the illustration in the right.)
CH-1 : A1/A2 ENV/HN-257 board
TRIG : FRAME_PULSE/HN-257 board
Set an oscilloscope as follows.
CH-1 : 200 mV/DIV
TRIG : 100 mV/DIV
TIME : 2 ms/DIV
(3) Play back the alignment tape (00 : 00 to 15 : 00).
J-1 : SR2-1 (or SR2-1P)
J-2 : MR2-1P
J-3 : MR2-1P
(4) While pressing the CTL/TC/UB button, rotate the JOG dial (or SHUTTLE ring) to adjust the RF envelope waveform until the maximum RF envelope waveform is obtained.
(5) While pressing the CTL/TC/UB button, rotate the JOG dial (or SHUTTLE ring) so that the center of the RF envelope waveform has the amplitude of 80% with respect to the maximum amplitude of the waveform.
(6) Adjust height of the T2 guide upper flange until the RF envelope waveform satisfies the specification 7.
If the specification 7 is not satisfied, perform the “Tape Running System Check and Adjustment” (Refer to Section 6-2.) and “Video Tracking Check and Adjustment” (this Section).

• **Connecting an oscilloscope**



• **Alignment tape : SR2-1/SR2-1P/MR2-1P (00 : 00 to 15 : 00)**



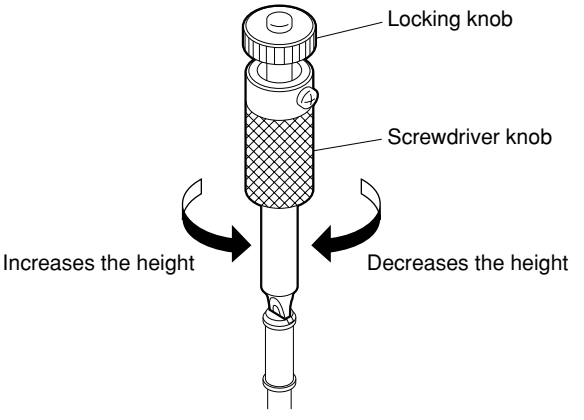
Specification 6 : Amplitude of the waveform at the entrance side is 80% or more of the maximum amplitude A.

$$\frac{B}{A} \geqq 0.80$$

Specification 7 : Amplitude of the waveform at the exit side is 80% or more of the maximum amplitude A.

$$\frac{C}{A} \geqq 0.80$$

• **Tape guide height adjustment**



When the Adjustment is Performed

11. Perform all of Sections 6-4 and higher.

6-4. CTL Head Position Check and Adjustment

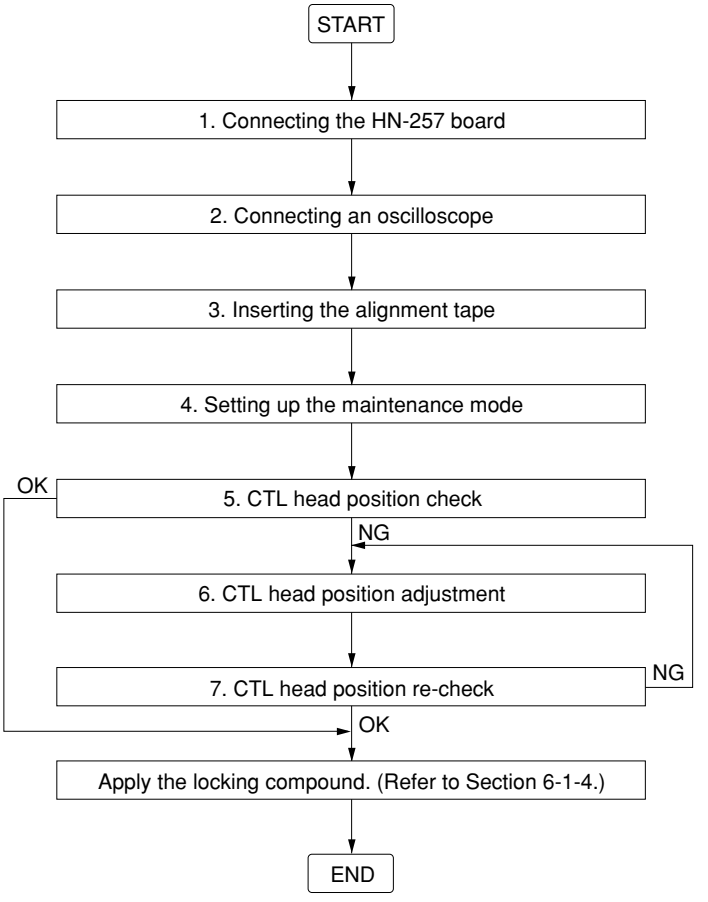
Notes

The CTL head position adjustment is closely related with the AT head position adjustment.
If the CTL head position is adjusted, be sure to check that AT head position satisfies the specification.

Tools and Measuring Equipment

- Alignment tape CR2-1B : 8-960-096-01
  or CR2-1B PS : 8-960-096-51
- Oscilloscope (TEKTRONIX TDS460A or equivalent)
- HN-257 board : A-8317-304-A
- Torque screwdriver (0.3 N•m {3 kgf•cm}) : J-6325-400-A
- Torque screwdriver's bit (M2, l = 162 mm) : J-6325-380-A

CTL Head Position Check and Adjustment Flow



Setting

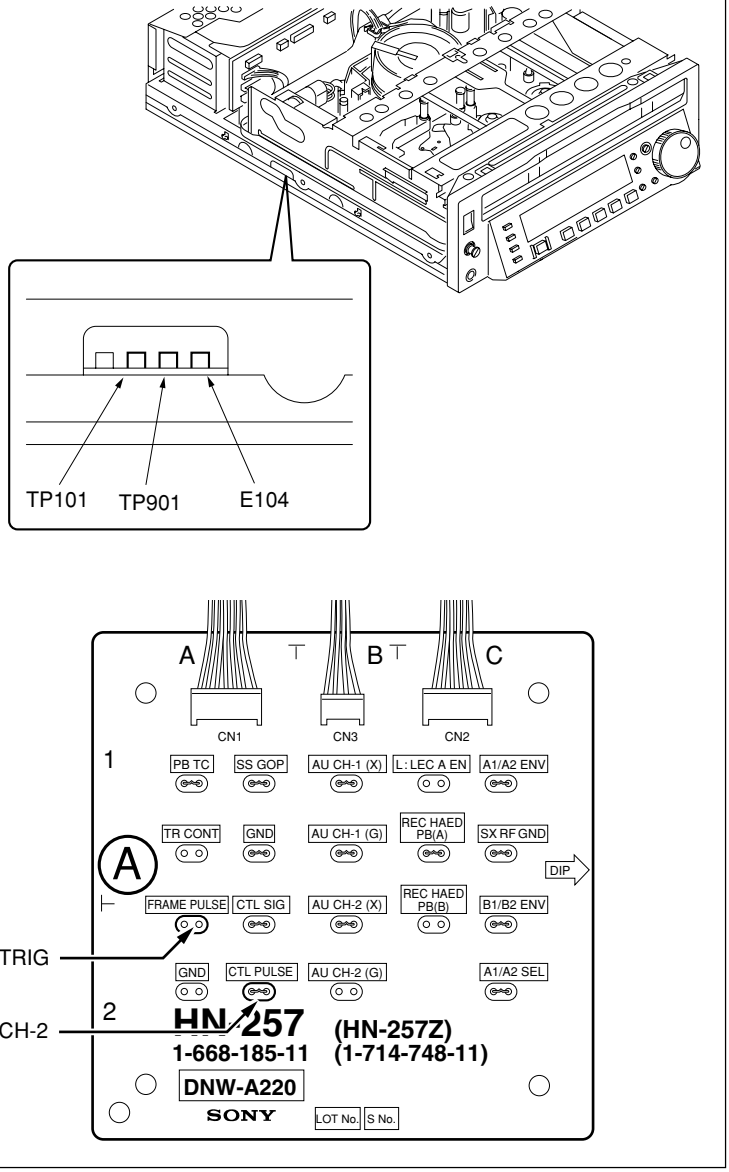
1. Connecting the HN-257 board (Tape path harness)

(Refer to Section 6-1-5.)

2. Connecting an oscilloscope

Connect an oscilloscope to the following points. (See the illustration in the right.)
CH-1 : TP101/DM124 board
CH-2 : CTL PULSE/HN-257 board
TRIG : FRAME PULSE/HN-257 board
Set an oscilloscope as follows.
CH-1 : 50 mV/DIV
CH-2 : 5 V/DIV
TRIG : 5 V/DIV
TIME : 2 ms/DIV

• **Connecting an oscilloscope**



3. Inserting the alignment tape

(1) Turn on the power switch.
(2) Insert the CR2-1B (or CR2-1B PS).

4. Setting up the maintenance mode

(1) Start up the maintenance mode.
(2) Enter A50 : PATH MODE SELECT.
Maintenance mode → M1 : ADJUST → A5 : MECHANISM ADJUST → A50 : PATH MODE SELECT
(3) When the SET button is pressed again, a white square mark appears in the top right of video monitor display.

Note

Refer to Section 3 for details of the maintenance mode.

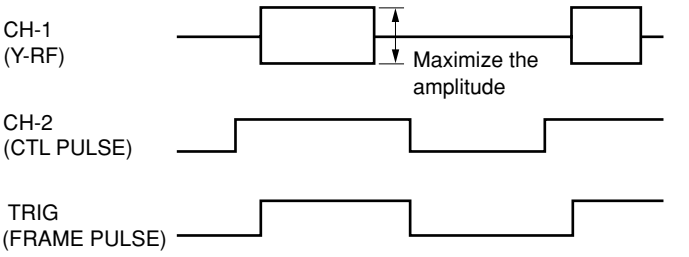
Check Procedure

5. CTL head position check

(1) Play back the CR2-1B (or CR2-1B PS) (00 : 00 to 28 : 00).
(2) Press the MENU (SHIFT + SET) button once to exit the mode.
(3) Rotate the JOG dial (or SHUTTLE ring) to move the cursor (∗) to TRACKING VOLUME.
(4) While pressing the CTL/TC/UB button, rotate the JOG dial (or SHUTTLE ring) and check the maximum amplitude of the RF envelope waveform is obtained at the time data displaying value of 200. (Specification 2)

If the specification is not satisfied, perform the adjustments of step 6 and higher.

• **Alignment tape : CR2-1B/CR2-1B PS (00 : 00 to 28 : 00)**

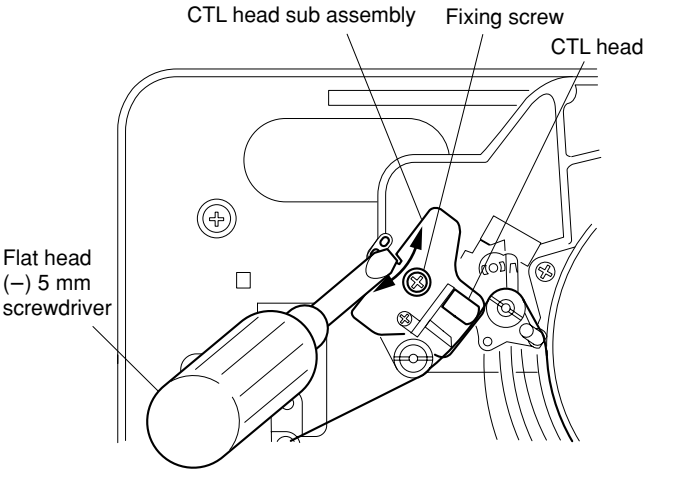


Specification : The maximum amplitude of the RF envelope waveform is obtained at the time data displaying value of 200.

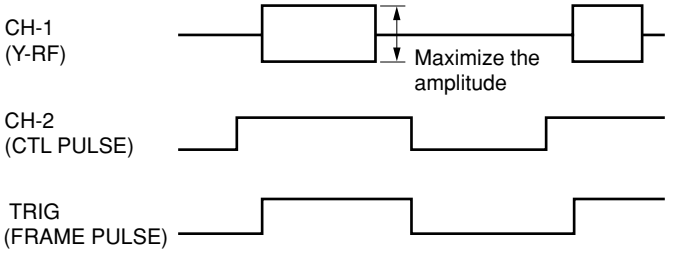
Adjustment Procedure

6. CTL head position adjustment

(1) Check that the VOL display on the time data display block is 200.
(2) Loosen the fixing screw of the CTL head sub assembly by 1/4 to 1/2 turn.
(3) Play back the CR2-1B (or CR2-1B PS) (00 : 00 to 28 : 00).
(4) Adjust the CTL head sub assembly position by inserting the flat head (−) 5 mm screwdriver tip into the notch of the AC head assembly until the center of the RF envelope waveform has the maximum amplitude.
(5) Tighten the fixing screw of the CTL head sub assembly that is loosened in step (2).
Tightening torque : 40×10^{-2} N•m
{4.0 kgf•cm}



• **Alignment tape : CR2-1B/CR2-1B PS (00 : 00 to 28 : 00)**



7. CTL head position re-check

Repeat steps 4 and 5 again.

8. Apply the locking compound

Refer to Section 6-1-4.

When the Adjustment is Performed

9. Perform all of Sections 6-5 and higher.

6-5. Play back PLL Adjustment (Automatic Adjustment)

Note

Perform this adjustment during the adjustment of the tape running system only after the drum is replaced. If the drum is not replaced, this adjustment is not necessary. Perform the adjustment of Section 6-7.

Tools and Measuring Equipment

- Alignment tape SR5-1 : 8-960-075-01 (J-1)
  or SR5-1P : 8-960-075-51 (J-1)
  Alignment tape MR5-1 : 8-960-077-01 (J-2/J-3)
  or MR5-1P : 8-960-077-51 (J-2/J-3)
- Analog composite video monitor

  Note

  Connect the monitor to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.

Adjustment Procedure

1. Play back PLL adjustment

(1) Turn on the power switch.
(2) Insert the alignment tape.

Notes

- Use the specified alignment tape for adjustment. If an alignment tape other than the specified ones is used, the appropriate adjustment cannot be performed even though the message “Auto Adjust Complete” appears after the adjustment ends.
- The automatic adjustment requires the alignment tape of about 12 seconds long during normal adjustment. If an error occurs during the adjustment, the time will change accordingly.

(3) Start up the maintenance mode.
(4) For J-1, enter A103 : PLAY PLL.
Maintenance mode → M1 : ADJUST → A1 : RF ADJUST → A10 : SX RF ADJUST → A103 : PLAY PLL
For J-2/J-3, select A113 : PLAY PLL.
Maintenance mode → M1 : ADJUST → A1 : RF ADJUST → A11 : IMX RF ADJUST → A113 : PLAY PLL
(5) Turn the JOG dial (or SHUTTLE ring) to move the cursor (✻) to ALL.
(6) Press the SET button.
- The tape starts running automatically and the automatic adjustment starts.
- The message “Auto Adjusting ...” appears on the superimposed display.

Note

Never touch the buttons nor the JOG dial (or SHUTTLE ring) that affect tape motion while the automatic adjustment is under way.
If the tape running status changes, the correct adjustment cannot be obtained. Or automatic adjustment is stopped in the middle of the course or the adjustment result shows “FAIL” or “NG”.

(7) Check the result of the automatic adjustment on the superimposed display.
- When the automatic adjustment ends with success without any abnormality, “OK” appears in the right of ALL.
- If the message “Condition NG” or “Auto Adjust Incomplete” appears on the superimposed display, go to [Condition NG/Automatic Adjustment Fails] on page 3-52.
- Press the STOP button to check the adjustment data.

(8) Press the MENU (SHIFT + SET) button twice and exit A10 (J-1)/A11 (J-2/J-3).

2. Saving the data (Saving the adjustment data)

(1) Enter A1F : NV-RAM CONTROL and execute “SAVE ALL ADJUST DATA”.
- When the data is saved correctly, the message “Save Complete” appears on the video monitor.

(2) Exit the maintenance mode.

When the Adjustment is Complete

3. Perform all of Sections 6-6 and higher.

6-6. Drum Phase Adjustment (Automatic Adjustment)

Notes

- Perform this adjustment during the adjustment of the tape running system only after the drum is replaced. If the drum is not replaced, this adjustment is not necessary. Perform the adjustment of Section 6-7.
- Be sure to complete the play back PLL adjustment (by referring to Section 6-5) before starting this adjustment.

Tools and Measuring Equipment

- Alignment tape SR5-1 : 8-960-075-01 (J-1)
  or SR5-1P : 8-960-075-51 (J-1)
  Alignment tape MR5-1 : 8-960-077-01 (J-2/J-3)
  or MR5-1P : 8-960-077-51 (J-2/J-3)
- Analog composite video monitor

  Note

  Connect the monitor to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.

Adjustment Procedure

1. Drum phase adjustment

(1) Start up the maintenance mode.
(2) Enter A0A : RF SWITCHING POS.
Maintenance mode → M1 : ADJUST → A0 : SERVO ADJUST → A0A : RF SWITCHING POS.
(3) The message “Auto Adjust (Push SET)” appears. Press the SET button.
(4) Insert the alignment tape that is rewinded to the time code 00 : 00 : 00 : 00.
- As the alignment tape is inserted, the automatic adjustment starts.
- When the automatic adjustment is complete, the message “Auto Adjust Complete” appears on the video monitor.

Note

Use the specified alignment tape for adjustment. If an alignment tape other than the specified ones is used, the appropriate adjustment cannot be performed even though the message “Auto Adjust Complete” appears after the adjustment ends.

(5) Press the MENU (SHIFT + SET) button once and exit A0A : RF SWITCHING POS.

2. Saving the data (Saving the adjustment data)

(1) Enter A0F : NV-RAM CONTROL and execute “SAVE SERVO ADJUST DATA”.
- When the data is saved correctly, the message “Save Complete” appears on the video monitor.

(2) Exit the maintenance mode.
(3) Eject the alignment tape.

When the Adjustment is Complete

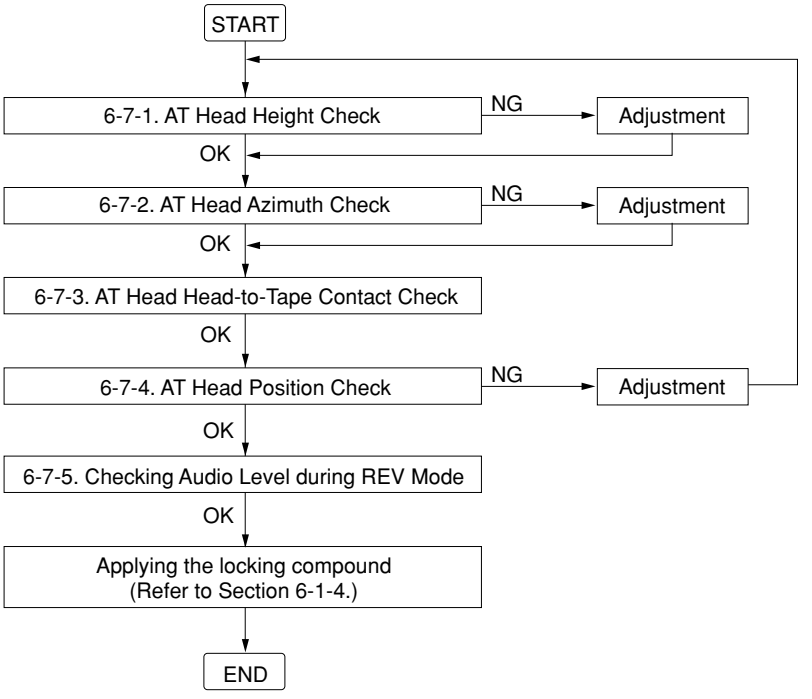
3. Perform all of Sections 6-7 and higher.

6-7. AT Head Check and Adjustment

Tools and Measuring Equipment

- Alignment tape CR8-1A : 8-960-097-45
  or CR8-1A PS : 8-960-098-45
- Alignment tape SR2-1 : 8-960-075-11
  or SR2-1P : 8-960-075-61
- Oscilloscope (TEKTRONIX TDS460A or equivalent)
- Mirror (small oval type) : J-6080-840-A
- Tape guide adjustment screwdriver : J-6082-044-A
  or J-6080-811-A
- HN-257 board : A-8317-304-A
- Nut driver (for cross : 5.5 mm) : 7-700-751-02
- Bamboo skewer

AT Head Check and Adjustment Flow



6-7-1. AT Head Height Check and Adjustment

Note

The AT head height adjustment is closely related with the azimuth adjustment and the position adjustment.
When the AT head height is adjusted, be sure to perform the Other Adjustments (or Other Checks) in accordance with [When the Adjustment Is Performed] of this section.

Setting

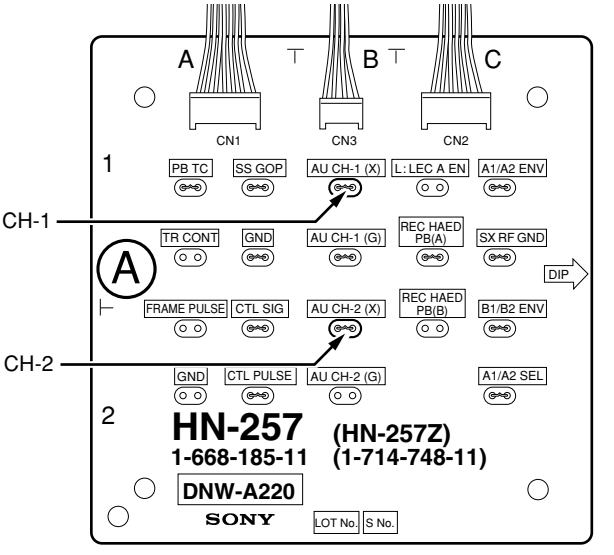
1. Connecting the HN-257 board (Tape path harness)

(Refer to Section 6-1-5.)

2. Connecting an oscilloscope

Connect an oscilloscope to the following points.
(See the illustration in the right.)
CH-1 : AU CH-1 (X)/HN-257 board
CH-2 : AU CH-2 (X)/HN-257 board
Set an oscilloscope as follows.
CH-1 : 200 mV/DIV
CH-2 : 200 mV/DIV
TIME : 5 ms/DIV

• **Connecting an oscilloscope**



3. Inserting the alignment tape

(1) Turn on the power switch.
(2) Insert the CR8-1A (or CR8-1A PS).

Check Procedure

4. AT head height check

(1) Play back the 1 kHz, 0 VU signal segment (00 : 00 to 02 : 55) of the CR8-1A (or CR8-1A PS).

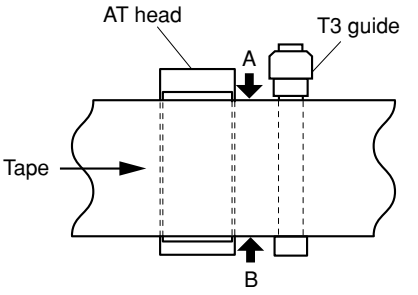
(2) Check to see that both the CH-1 and CH-2 audio level decreases when the portion “A” of the tape as shown in the illustration is pressed down.

If the audio level increases, perform step 5.

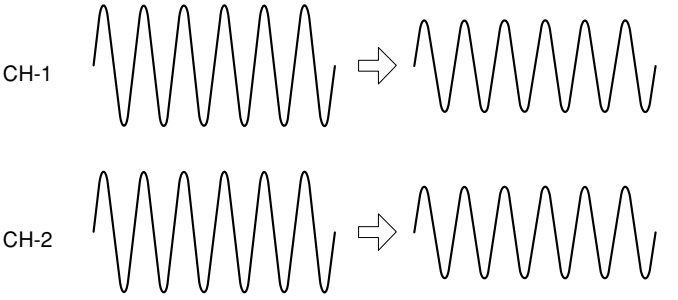
(3) Check to see that both the CH-1 and CH-2 audio level decreases when the portion “B” of the tape is pushed up.

If the audio level increases, perform step 6.

• Alignment tape : CR8-1A/CR8-1A PS (00 : 00 to 02 : 55)



<Audio output waveform>



Specification : Audio levels of both CH-1 and CH-2 decrease when the tape is shifted up and down.

Adjustment Procedure

5. When the audio level increases as the tape is pressed down

(1) Rotate the height adjustment nut counter-clockwise to the point where the output level starts to decrease exceeding the maximum level. (Item ① of Fig. 1)

(2) Rotate the height adjustment nut clockwise to the point that generates the maximum output level. (Item ② of Fig. 1)
(Perform the adjustment so that the distance between the two waveforms should be narrowed.)

Note

In order to stabilize the AT head height upon completion of the adjustment, the AT head height adjustment should end up with in the upward movement of the heat position from the bottom. (In the other words, the AT head height adjustment should end up in the clockwise rotation of the height adjustment nut.)

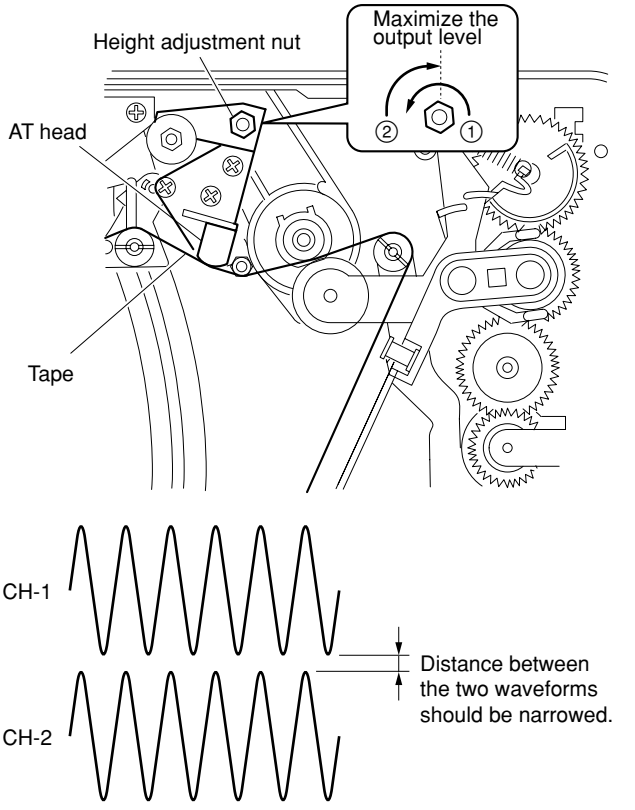
6. When the audio level increases as the tape is pushed up

Rotate the height adjustment nut clockwise to the point that generates the maximum output level. (Fig. 2)
(Perform the adjustment so that the distance between the two waveforms should be narrowed.)

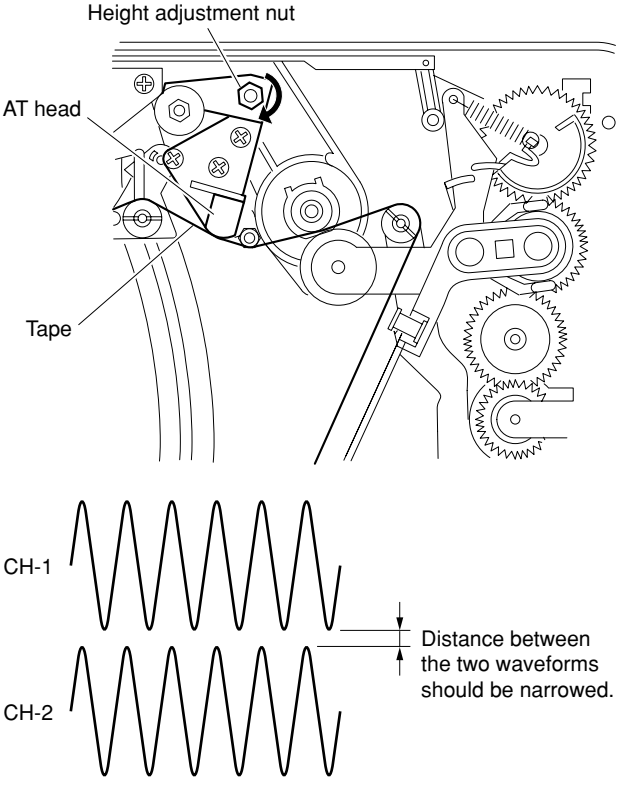
When the Adjustment is Performed

7. Perform all of Sections 6-7-2 and higher.

<Fig. 1>



<Fig. 2>



6-7-2. AT Head Azimuth Check and Adjustment

Note

The AT head azimuth adjustment is closely related with the position adjustment and the height adjustment.
When the AT head azimuth is adjusted, be sure to perform the other adjustments (or other checks) in accordance with “When the Adjustment is Performed” of this section.

Setting

1. Connecting the HN-257 board (Tape path harness)

(Refer to Section 6-1-5.)

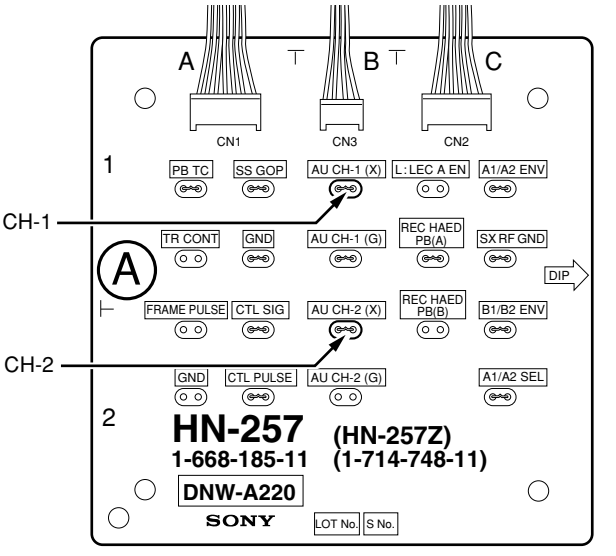
2. Connecting an oscilloscope.

Connect an oscilloscope to the following points. (See the illustration in the right.)
CH-1 : AU CH-1 (X)/HN-257 board
CH-2 : AU CH-2 (X)/HN-257 board
Set an oscilloscope as follows.
CH-1 : 200 mV/DIV
CH-2 : 200 mV/DIV
MODE : X-Y

3. Inserting the alignment tape

(1) Turn on the power switch.
(2) Insert the CR8-1A (or CR8-1A PS).

• **Connecting an oscilloscope**



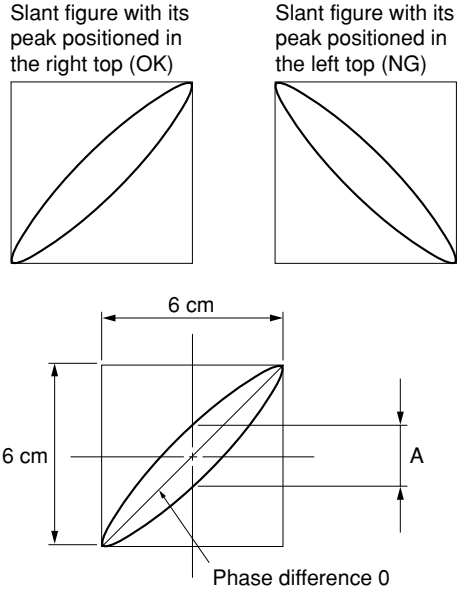
Check Procedure

4. AT head azimuth check

(1) Play back the 10 kHz, −10 VU signal segment (3 : 00 to 4 : 55) of the CR8-1A (or CR8-1A PS).
(2) Let an oscilloscope show the Lissaujou’s figure. Set both the horizontal and vertical deflections to 6 cm respectively.
(3) Check that the Lissaujou’s figure shows the narrow and slant figure with its peak positioned in the right top.
(4) Check that the amplitude in the vertical deflection of the center of the figure satisfies the specification.
(5) Repeat the modes from EJECT → PLAY and check that the specification is satisfied.

If the specification is not satisfied, perform the adjustments of step 5 and higher.

• **Alignment tape : CR8-1A/CR8-1A PS (3 : 00 to 4 : 55)**
<Lissaujou’s figure>


Slant figure with its peak positioned in the right top (OK)
Slant figure with its peak positioned in the left top (NG)
6 cm
6 cm
A
Phase difference 0

Specification : A ≦ 1 cm

Adjustment Procedure

5. AT head azimuth adjustment

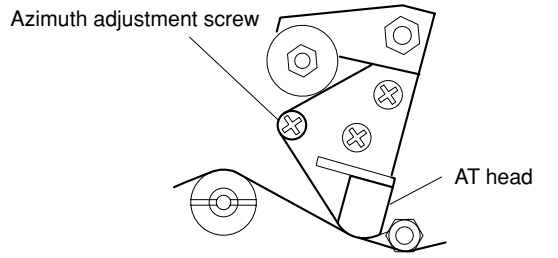
(1) Rotate the azimuth adjustment screw until the specification is satisfied.

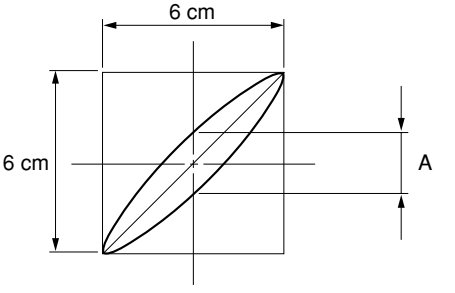
(2) Check that the specification is satisfied when the portion “A” shown in the illustration is tapped gently by the screwdriver tip.

When the Adjustment is Performed

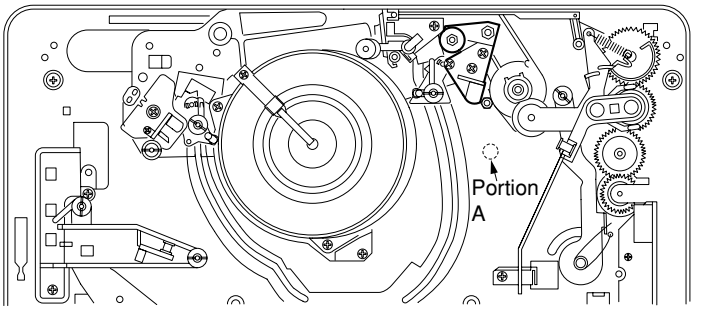
6. Perform all of Sections 6-7-3 and higher.

• **Alignment tape : CR8-1A/CR8-1A PS (3 : 00 to 4 : 55)**





Specification : A ≦ 1 cm



6-7-3. AT Head Head-to-Tape Contact Check

Setting

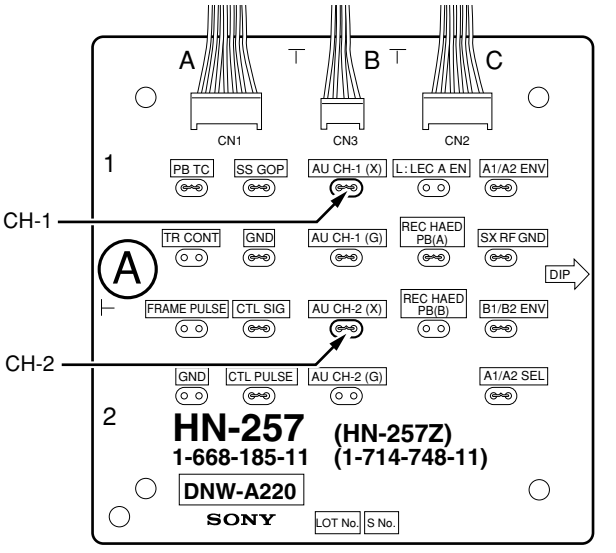
1. Connecting the HN-257 board (Tape path harness)

(Refer to Section 6-1-5.)

2. Connecting an oscilloscope.

Connect an oscilloscope to the following points.
(See the illustration in the right.)
CH-1 : AU CH-1 (X)/HN-257 board
CH-2 : AU CH-2 (X)/HN-257 board
Set an oscilloscope as follows.
CH-1 : 200 mV/DIV
CH-2 : 200 mV/DIV
TIME : 0.5 ms/DIV

• **Connecting an oscilloscope**



3. Inserting the alignment tape

(1) Turn on the power switch.
(2) Insert the CR8-1A (or CR8-1A PS).

Check Procedure

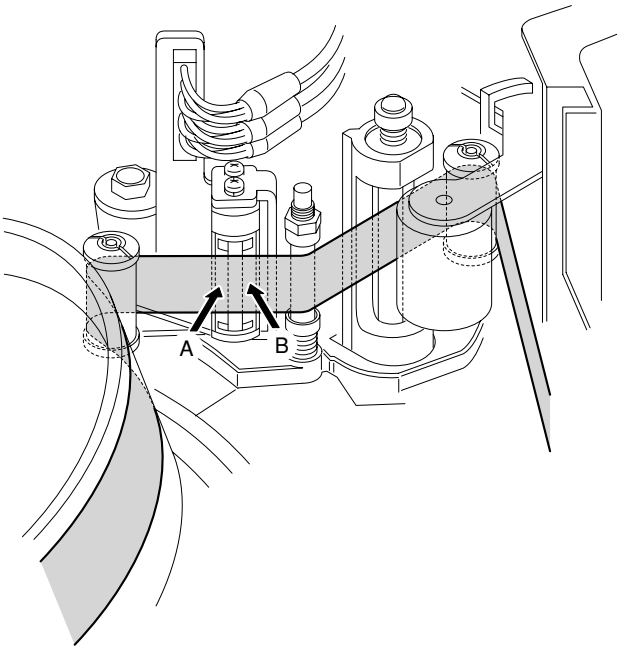
4. Checking head-to-tape contact of the AT head

(1) Play back the 10 kHz, −10 VU signal segment (3 : 00 to 4 : 55) of the CR8-1A (or CR8-1A PS).
(2) Press the portions “A” and “B” of the tape gently as shown in the illustration with a bamboo skewer. (Pressing the portions increases the wrapping angle of tape around the AT head.)
(3) Check that amount of increase of the output level of both the CH-1 and CH-2 satisfies the specification.

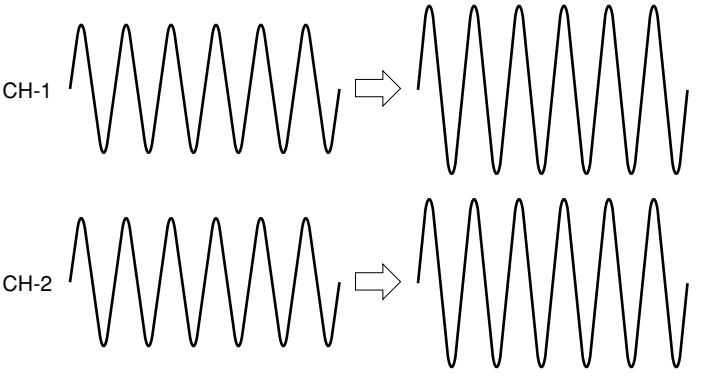
If the specification is not satisfied, perform the AT head position check (Refer to Section 6-7-4.) and the AT head azimuth check. (Refer to Section 6-7-2.)
If the specification is still not satisfied, perform the AT head zenith adjustment. (Refer to Section 5-6-3.)

5. Perform all of Sections 6-7-4 and higher.

• **Alignment tape : CR8-1A/CR8-1A PS (3 : 00 to 4 : 55)**



<Audio output waveform>



Specification : Amount of increase of the output level of both the CH-1 and CH-2 is 5% or less respectively.

6-7-4. AT Head Position Check and Adjustment

Notes

- Perform the CTL head position adjustment (by referring to Section 6-4) in advance before starting this adjustment. The AT head position should be adjusted using the CTL head position as its reference.
- The AT head position adjustment is closely related with the height adjustment and the azimuth adjustment.
  When the AT head position is adjusted, be sure to perform the other adjustments (or other checks) in accordance with “When the Adjustment is Performed” of this section.

Setting

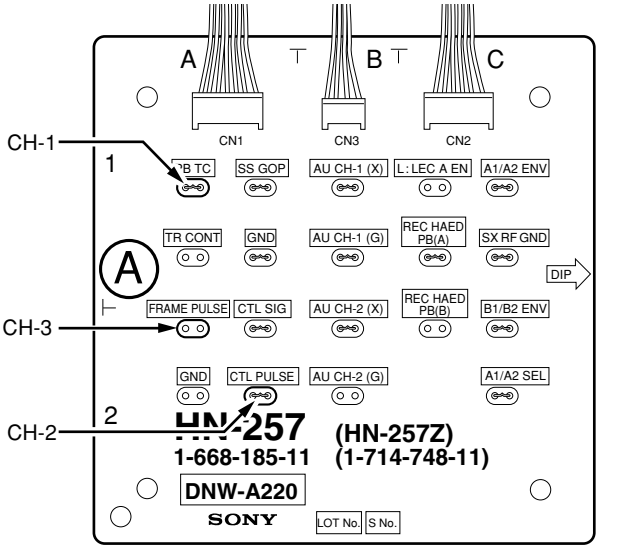
1. Connecting the HN-257 board (Tape path harness)

(Refer to Section 6-1-5.)

2. Connecting an oscilloscope.

Connect an oscilloscope to the following points.
(See the illustration in the right.)
CH-1 : PB TC/HN-257 board
CH-2 : CTL PULSE/HN-257 board
CH-3 : FRAME PULSE/HN-257 board
Set an oscilloscope as follows.
CH-1 : 1 V/DIV
CH-2 : 5 V/DIV
CH-3 : 100 mV/DIV
TIME : 5 ms to 500 µs/DIV

• **Connecting an oscilloscope**



3. Inserting the alignment tape

(1) Turn on the power switch.
(2) Insert the SR2-1 (or SR2-1P).

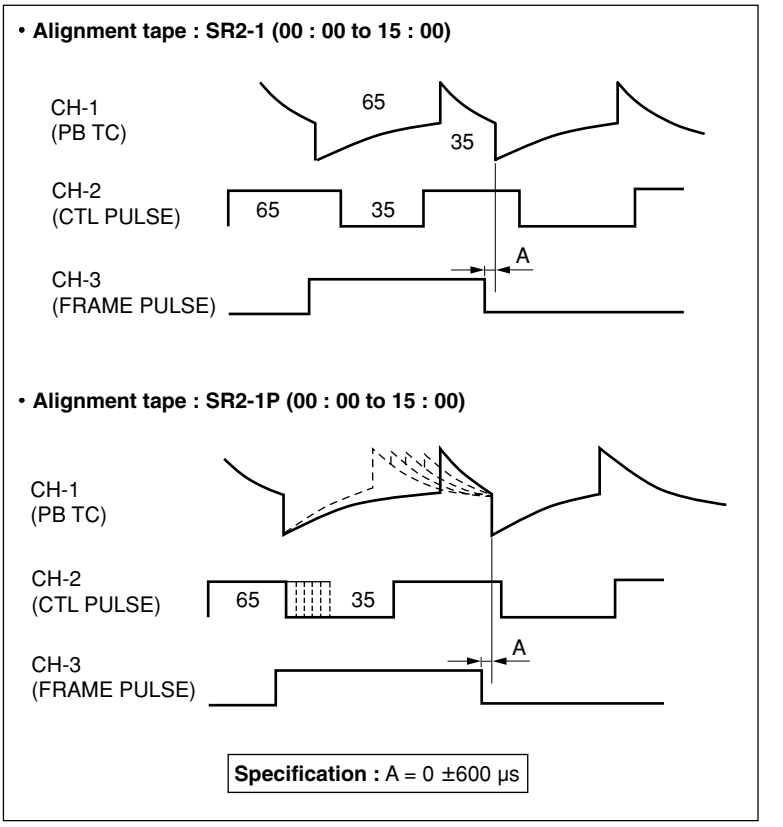
Check Procedure

4. AT head position check

(1) Play back the SR2-1 (or SR2-1P) (00 : 00 to 15 : 00).

(2) Check that the positional relation between the fall-down edge of the FRAME PULSE signal and the PB TC signal, satisfies the specification.

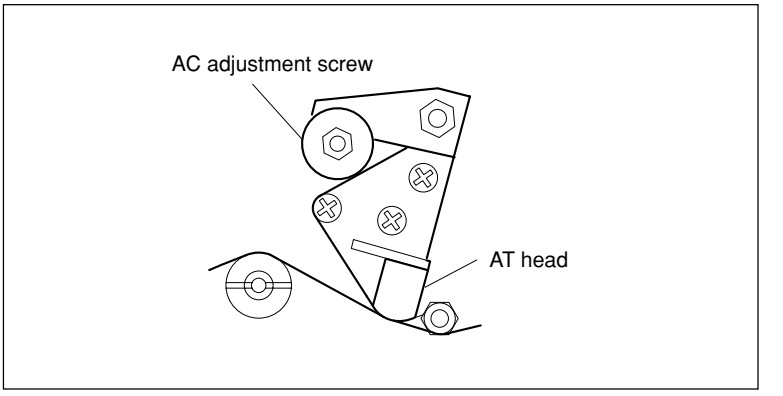
If the specification is not satisfied, perform the adjustments of step 5 and higher.



Adjustment Procedure

5. AT head position adjustment

Adjust position of the AT head by rotating the AC adjustment screw of the AT head assembly until the specification shown in step 4 is satisfied.



6. AT head position re-check

(1) Eject the alignment tape.

(2) Insert the alignment tape again.

(3) Repeat step 4 of this section 6-7-4 again.

When the Adjustment is Performed

7. Repeat Section 6-7-1 check of AT head again.

6-7-5. Checking Audio Level during REV Mode

Setting

1. Connecting the HN-257 board (Tape path harness)

(Refer to Section 6-1-5.)

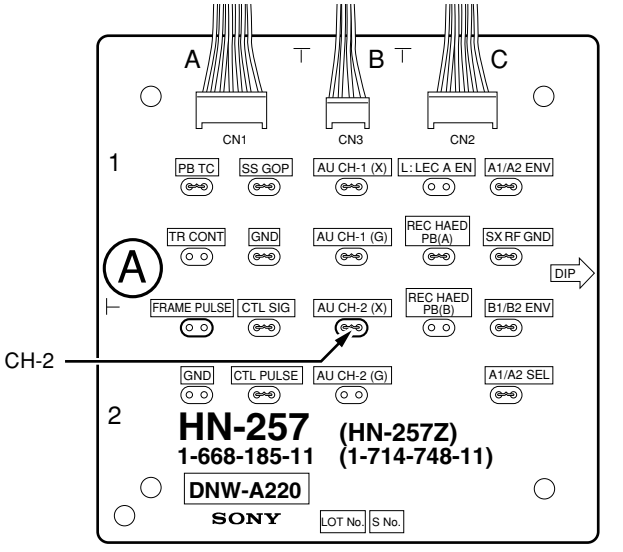
2. Connecting an oscilloscope.

Connect an oscilloscope to the following points. (See the illustration in the right.)
CH-2 : AU CH-2 (X)/HN-257 board
Set an oscilloscope as follows.
CH-2 : 100 mV/DIV
TIME : 2 ms/DIV

3. Inserting the alignment tape

(1) Turn on the power switch.
(2) Insert the CR8-1A (or CR8-1A PS).

• Connecting an oscilloscope



Check Procedure

4. Audio output level check

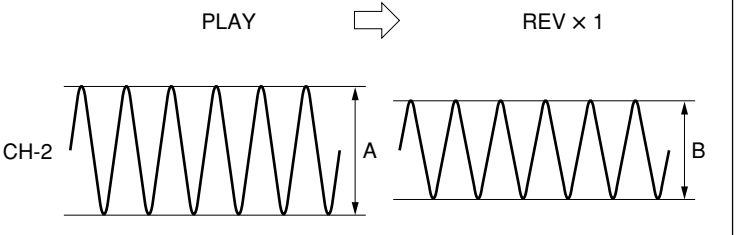
(1) Play back the 1 kHz, 0 VU signal segment (8 : 00 to 10 : 00) of the CR8-1A (or CR8-1A PS) in the PLAY mode.
(2) Check the audio CH-2 output level A.
(3) Establish the REV × 1 mode.
(4) Check that the audio CH-2 output level satisfies the specification.

If the specification is not satisfied, perform "Tape Running System Check in the REV × 1 mode" (Refer to Section 6-2.).

Note

If the specification is not satisfied, it is caused by the fact that height of the running tape changes at the AT head in the PLAY and REV modes.

• Alignment tape : CR8-1A/CR8-1A PS (8 : 00 to 10 : 00)



Specification : $\frac{B}{A} \times 100 \geqq 70\ \%$

Section 7
Electrical Alignment After Replacement of Main Parts

7-1. General Information on Electrical Alignment

7-1-1. Notes on Electrical Alignment

- Perform the respective adjustments in order of description.
- DO NOT touch inadvertently adjusting components.
- DO NOT execute or change data for adjusting items in the maintenance mode.
  If inadvertently executed or data is changed, turn of the power or execute “ALL DATA PREVIOUS” in the NV-RAM CONTROL menu. Never save data.

  Note

  In all systems other than the RF system, “ALL DATA PREVIOUS” is not provided.
  If inadvertently executed, turn of the power.
- For details on the maintenance mode, refer to Section 3.

7-1-2. Outline of Electrical Alignment

In this Section 7, the electrical adjustments that are required after replacement of the following parts, are described.

- Drum assembly/Upper drum assembly ..... Section 7-2.
- AT Head ..... Section 7-3.

Note

Before starting the electrical alignment of Section 7, the tape running system adjustment (Section 6) after replacement of parts, is required to be completed already.

7-2. Electrical Adjustment After Replacing the Drum

7-2-1. Outline of Adjustment

When the drum assembly or the upper drum assembly was replaced, perform this adjustment.
The items and the order of the adjustments are listed in the next page.

Equipment/Fixtures

To perform the electrical adjustment after drum replacement, the following equipment (or equivalent) and fixtures are needed.

Analog component waveform monitor		TEKTRONIX WFM-300A		J-1/901, J-2/901, J-3/901
Serial component waveform monitor		TEKTRONIX WFM-600		J-1/902, J-2/902, J-3/902
Oscilloscope		TEKTRONIX TDS460A		
Spectrum analyzer		ADVANTEST R3261A		
Analog composite video monitor **Note** Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) on the connector panel.				
Cleaning tape		BCT-HD12CL (Merchandise available on market)		
Alignment tape	525 system	SR2-1	(Part No. 8-960-075-11)	J-1, J-2, J-3
		SR5-1	(Part No. 8-960-075-01)	
		CR5-1B	(Part No. 8-960-096-41)	
		CR5-2A	(Part No. 8-960-097-44)	
		MR5-1	(Part No. 8-960-077-01)	J-2, J-3
		ZR5-1	(Part No. 8-960-073-01)	J-3
	625 system	SR2-1P	(Part No. 8-960-075-61)	J-1, J-2, J-3
		SR5-1P	(Part No. 8-960-075-51)	
		CR5-1B PS	(Part No. 8-960-096-91)	
		CR5-2A PS	(Part No. 8-960-098-44)	
		MR5-1P	(Part No. 8-960-077-51)	J-2, J-3
		ZR5-1P	(Part No. 8-960-073-51)	J-3
75 Ω terminator (3 pieces)				

Adjustment Items

Note

In Section 7-2-4, perform required the adjustment menus according to the digital formats that can be played back in this unit.

Section	Item			Adjusting location		Remarks
7-2-3	Drum phase adjustment			A0A : RF SWITCHING POS.		(Automatic adjustment)
			Data save	A0F : NV-RAM CONTROL		
7-2-4	Playback equalizer adjustment		Betacam SX	A107 : A101-A106 ALL ADJUST	J-1/J-2/J-3	(Automatic adjustment)
			Data save	A1F : NV-RAM CONTROL		
			MPEG IMX	A117 : A111-A116 ALL ADJUST	J-2/J-3	(Automatic adjustment)
			Data save	A1F : NV-RAM CONTROL		
			Digital Betacam	A127 : A121-A126 ALL ADJUST	J-3	(Automatic adjustment)
			Data save	A1F : NV-RAM CONTROL		
7-2-5	DM RF output level adjustment (Analog Betacam)		OXIDE Y	⊘RV112/DM-124		TP107/DM-124
			OXIDE C	⊘RV312/DM-124		TP307/DM-124
			METAL C	⊘RV311/DM-124		TP307/DM-124
			METAL Y	⊘RV111/DM-124		TP107/DM-124
7-2-6	OMC carrier balance adjustment (Analog Betacam) (Perform in 625 system.)		METAL Y	A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-A A37 : OMC LIM BALANCE VR : OMC LIM METAL -Y-B		TP109/DM-124
			METAL C	A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-A A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-B		TP309/DM-124
			OXIDE C	A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-A A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-B		TP309/DM-124
			OXIDE Y	A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-A A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-B		TP109/DM-124
			Data save	A3F : NV-RAM CONTROL		
7-2-7	OMC carrier balance provisional adjustment (Analog Betacam) (Perform in 625 system.)			**Note** Section 7-2-6 describes the adjustment method when the spectrum analyzer is available. Section 7-2-7 describes the provisional adjustment method when the spectrum analyzer is not available. Use the provisional adjustment method only in an emergency or when an spectrum analyzer is not available. Be sure to perform the adjustment (Section 7-2-6) using the spectrum analyzer at a later date.		
7-2-8	Demodulator lmiter balance adjustment (Analog Betacam)	625 system	OXIDE Y	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-Y		TP502/DM-124
			METAL Y	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-Y		TP502/DM-124
			METAL C	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-C		TP706/DM-124
			OXIDE C	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-C		TP706/DM-124
			Data save	A3F : NV-RAM CONTROL		
		525 system	METAL C	A38 : DEMO BAL VR : DEMO BAL METAL-C		TP706/DM-124
			OXIDE C	A38 : DEMO BAL VR : DEMO BAL OXIDE-C		TP706/DM-124
			Data save	A3F : NV-RAM CONTROL		

(Continued)

(Continued)

Section	Item			Adjusting location	Remarks
7-2-9	Playback frequency response adjustment (Analog Betacam)	625 system	METAL Y	A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-B	VIDEO OUTPUT
			METAL C	A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-B	VIDEO OUTPUT
			OXIDE Y	A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-B	VIDEO OUTPUT
			OXIDE C	A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-B	VIDEO OUTPUT
			Data save	A3F : NV-RAM CONTROL	
		525 system	METAL Y	A31 : COS EQ VR (METAL) : EQ1 METAL-Y-A A31 : COS EQ VR (METAL) : EQ1 METAL-Y-B	VIDEO OUTPUT
			METAL C	A31 : COS EQ VR (METAL) : EQ1 METAL-C-A A31 : COS EQ VR (METAL) : EQ1 METAL-C-B	VIDEO OUTPUT
			OXIDE Y	A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-A A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-B	VIDEO OUTPUT
			OXIDE C	A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-A A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-B	VIDEO OUTPUT
			Data save	A3F : NV-RAM CONTROL	
7-2-10	DM RF output level re-adjustment (Analog Betacam) (Perform “7-2-5. DM RF Output Level Adjustment” again.)		OXIDE Y	⊘RV112/DM-124	TP107/DM-124
			OXIDE C	⊘RV312/DM-124	TP307/DM-124
			METAL C	⊘RV311/DM-124	TP307/DM-124
			METAL Y	⊘RV111/DM-124	TP107/DM-124
7-2-11	RF envelope adjustment (Analog Betacam)		Y	⊘RV113/DM-124	TP112/DM-124
			C	⊘RV313/DM-124	TP312/DM-124
7-2-12	TBC Y/C delay adjustment (Analog Betacam)	625 system	METAL	A42 : YC DL/Y TR VR : Y/C DELAY M-A A42 : YC DL/Y TR VR : Y/C DELAY M-B	VIDEO OUTPUT
			OXIDE	A42 : YC DL/Y TR VR : Y/C DELAY O-A A42 : YC DL/Y TR VR : Y/C DELAY O-B	VIDEO OUTPUT
			Data save	A4F : NV-RAM CONTROL	
		525 system	METAL	A42 : YC DL VR : Y/C DELAY M-A A42 : YC DL VR : Y/C DELAY M-B	VIDEO OUTPUT
			OXIDE	A42 : YC DL VR : Y/C DELAY O-A A42 : YC DL VR : Y/C DELAY O-B	VIDEO OUTPUT
			Data save	A4F : NV-RAM CONTROL	

7-2-2. Notes on Electrical Alignment

Confirmation of video system

The electrical adjustments of this unit after replacement of drum, are performed by switching the 625 system and the 525 system alternately. Perform each adjustment in accordance with the video system that is specified in each adjustment item.
Unless otherwise specified, use the video system in which the unit is used usually at the customer's location.
To change the video systems, enter the setup menu ITEM-013: 525/625 SYSTEM SELECT. (Refer to "Basic Menu" of the Operation Manual.)

Confirmation of setting the switch on the DM-124 board

Confirm that the switches S1701 and S1801 are set in the factory setting positions (OFF).

Confirmation of warming-up

Warm up the unit and equipment through the power for 20 minutes or more before starting the adjustments.

How to change data

Change the data in the maintenance mode in the following manner.

1. Move the mark "∗" to an item to be changed on the video monitor by turning the JOG dial (or SHUTTLE ring).
   (Display an item name on the time data display area. For example, "RF GAIN-RF-MYA", etc.)
2. While pressing the JOG/SHUTTLE button, rotate the JOG dial (or SHUTTLE ring) to change the data.

How to eject a cassette tape

Normally, enter the menu A3x or A4x of the maintenance mode, and eject a cassette tape in the following manner. (A cassette tape can be ejected in other method. But it is omitted.)

1. When instructed to eject a cassette tape, press the SET button once.
   - The white square mark to indicate the ejection appears on the right side corner of a superimposed picture on the video monitor.
2. Press the EJECT button to eject the cassette tape.
3. Press the MENU (SHIFT + SET) button once.
   - The white square mark appearing on the video monitor disappears.

Note

In the sentence, it is supplemented with (SET → EJECT → MENU).

7-2-3. Drum Phase Adjustment

Perform this adjustment in the mainly used video system.

1. Start up the maintenance mode.
2. Enter A0A : RF SWITCHING POS.
   Maintenance mode → M1 : ADJUST → A0 : SERVO ADJUST → A0A : RF SWITCHING POS.
   - "Auto Adjust (Push SET)" appears on the video monitor.
3. Press the SET button.
4. Insert the following alignment tape.
   525 system : SR5-1
   625 system : SR5-1P
   - When the alignment tape is inserted, the automatic adjustment starts.
   - When the automatic adjustment finishes properly, "Adjust Complete" appears on the video monitor.
5. Press the MENU (SHIFT + SET) button once to exit A0A : RF SWITCHING POS.

Data save (save of adjusted data)

6. Enter A0F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When "data save" finishes properly, "Save Complete" appears on the video monitor.
7. Terminate the maintenance mode.
8. Eject the alignment tape.

7-2-4. Playback Equalizer Adjustment

Perform this adjustment in the mainly used video system.

1. Betacam SX Playback Equalizer Adjustment

Note

Perform this adjustment on a unit (J-1, J-2 or J-3) which has the playback function of Betacam SX format.

1. Insert the following alignment tape. Cue up the tape at a time code of 00:08:00:00.
   - 525 system : SR5-1
   - 625 system : SR5-1P
2. Start up the maintenance mode.
3. Enter A107 : A101- A106 ALL ADJUST.
   Maintenance mode → M1 : ADJUST → A1 : RF ADJUST → A10 : SX RF ADJUST → A107 : A101-A106 ALL ADJUST.
   - "Auto Adjust (Push SET)" appears on the video monitor.
4. Press the SET button to start the automatic adjustment.
   - About 5 to 6 minutes later, the automatic adjustment of the playback system finishes and "Auto Adjust Complete" appears on the video monitor.
5. Press the MENU (SHIFT + SET) button twice to exit A10 : SX RF ADJUST.

Data save (save of adjusted data)

Note

If any anomaly occurs in the automatic adjustment, DO NOT save the data.

6. Enter A1F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

   Note

   When returning to the state before adjustment without saving the adjusted data, execute "ALL DATA PREVIOUS".
7. Terminate the maintenance mode.
8. Eject the alignment tape.

2. MPEG IMX Playback Equalizer Adjustment

Note

Perform this adjustment on a unit (J-2 or J-3) which has the playback function of MPEG IMX format.

1. Insert the following alignment tape. Cue up the tape at the time code of 00:08:00:00.
   - 525 system : MR5-1
   - 625 system : MR5-1P
2. Start up the maintenance mode.
3. Enter A117 : A111- A116 ALL ADJUST.
   Maintenance mode → M1 : ADJUST → A1 : RF ADJUST → A11 IMX RF ADJUST → A117 : A111-A116 ALL ADJUST.
   - "Auto Adjust (Push SET)" appears on the video monitor.
4. Press the SET button to start the automatic adjustment.
   - About 5 to 6 minutes later, the automatic adjustment finishes and "Auto Adjust Complete" appears on the video monitor.
5. Press the MENU (SHIFT + SET) button twice to exit A11 : IMX RF ADJUST.

Data save (save of adjusted data)

Note

If any anomaly occurs in the automatic adjustment, DO NOT save the data.

6. Enter A1F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

   Note

   When returning to the state before adjustment without saving the adjusted data, execute "ALL DATA PREVIOUS".
7. Terminate the maintenance mode.
8. Eject the alignment tape.

3. Digital Betacam Playback Equalizer Adjustment

Note

Perform this adjustment on a unit (J-3) which has the playback function of Digital Betacam format.

1. Insert the following alignment tape. Cue up the tape at a time code of 00:08:00:00.
   - 525 system : ZR5-1
   - 625 system : ZR5-1P
2. Start up the maintenance mode.
3. Enter A127 : A121- A126 ALL ADJUST.
   Maintenance mode → M1 : ADJUST → A1 : RF ADJUST → A12 : DB RF ADJUST → A127 : A121-A126 ALL ADJUST.
   - "Auto Adjust (Push SET)" appears on the video monitor.
4. Press the SET button to start the automatic adjustment.
   - About 5 to 6 minutes later, the automatic adjustment finishes and "Auto Adjust Complete" appears on the video monitor.
5. Press the MENU (SHIFT + SET) button twice to exit A12 : DB RF ADJUST.

Data save (save of adjusted data)

Note

If any anomaly occurs in the automatic adjustment, DO NOT save the data.

6. Enter A1F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

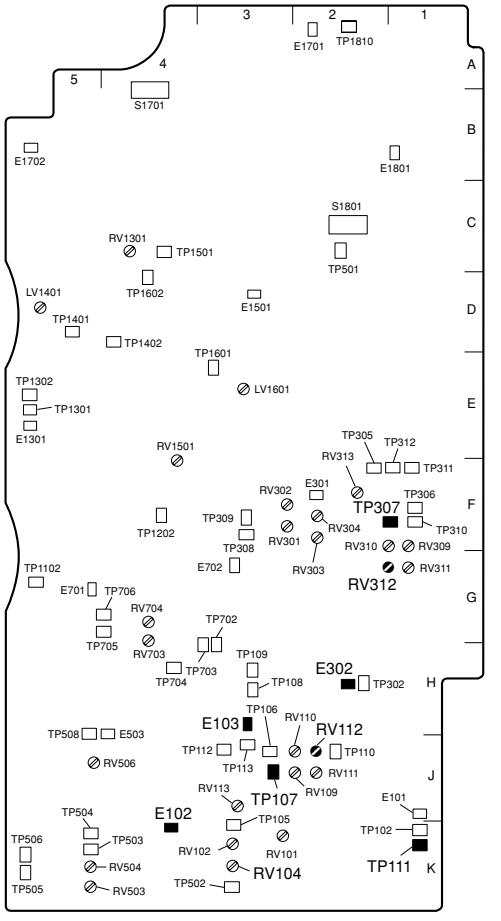
   Note

   When returning to the state before adjustment without saving the adjusted data, execute "ALL DATA PREVIOUS".
7. Terminate the maintenance mode.
8. Eject the alignment tape.

7-2-5. DM RF Output Level Adjustment (Analog Betacam)

Perform this adjustment in the mainly used video system.

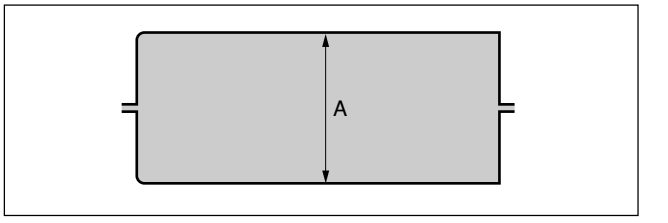
Equipment : Oscilloscope



DM-124 Board (Side A)

1. OXIDE Y Adjustment

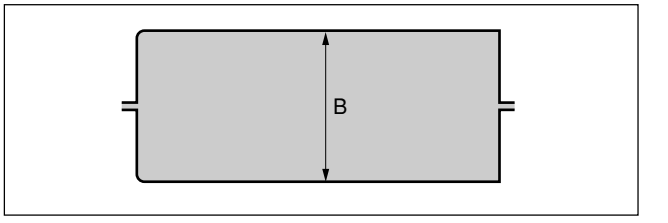
1. Connect and set the oscilloscope as follows.
   CH-1 : TP107/DM-124 (J-3), AC 100 mV/DIV
   GND : E102/DM-124 (K-4)
   CH-2 : TP111/DM-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME : 2 ms/DIV
   TRIG : CH-2, −slope
2. Play back the 75 % color bars signal portion (00 : 00 to 03 : 00) of the following alignment tape.
   • 525 system : CR5-2A
   • 625 system : CR5-2A PS
3. Check the level at center of V period.
   If not met the specification, adjust.
   Adjusting location : ⊘RV112/DM-124 (J-2)
   Specification : A = 400 ±40 mV p-p



4. Stop the playback of the alignment tape.

2. OXIDE C Adjustment

1. Change only the connection of CH-1 of the oscilloscope as follows.
   (Keep the setting and the connection of CH-2 unchanged.)
   CH-1 : TP307/DM-124 (F-2)
   GND : E302/DM-124 (H-2)
2. Play back the 75 % color bars signal portion (00 : 00 to 03 : 00) of the following alignment tape.
   • 525 system : CR5-2A
   • 625 system : CR5-2A PS
3. Check the level at center of V period.
   If not met the specification, adjust.
   Adjusting location : ⊘RV312/DM-124 (G-1)
   Specification : B = 400 ±40 mV p-p



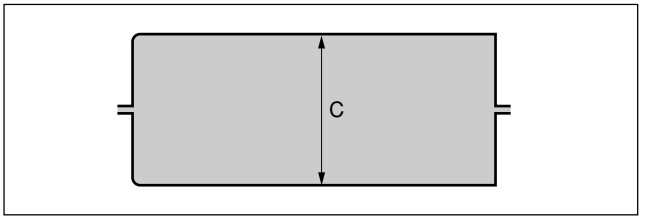
4. Eject the alignment tape.

3. METAL C Adjustment

Note

Keep the connection of the oscilloscope unchanged.

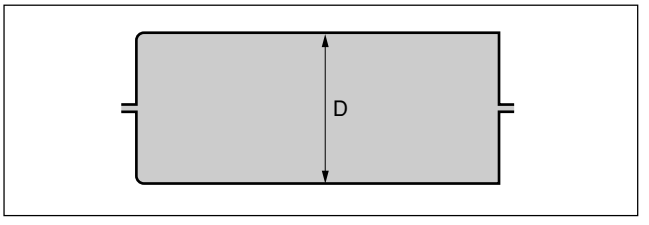
1. Play back the flat field signal portion (24 : 00 to 26 : 00) of the following alignment tape.
   - 525 system : CR5-1B
   - 625 system : CR5-1B PS
2. Check the level at center of V period.
   If not met the specification, adjust.
   Adjusting location : ◓RV311/DM-124 (G-1)
   Specification : C = 400 ±40 mV p-p



3. Stop the playback of the alignment tape.

4. METAL Y Adjustment

1. Change only the connection of CH-1 of the oscilloscope as follows.
   (Keep the setting and the connection of CH-2 unchanged.)
   CH-1 : TP107/DM-124 (J-3)
   GND : E102/DM-124 (K-4)
2. Play back the flat field signal portion (24 : 00 to 26 : 00) of the following alignment tape.
   - 525 system : CR5-1B
   - 625 system : CR5-1B PS
3. Check the level at center of V period.
   If not met the specification, adjust.
   Adjusting location : ◓RV111/DM-124 (J-2)
   Specification : D = 400 ±40 mV p-p

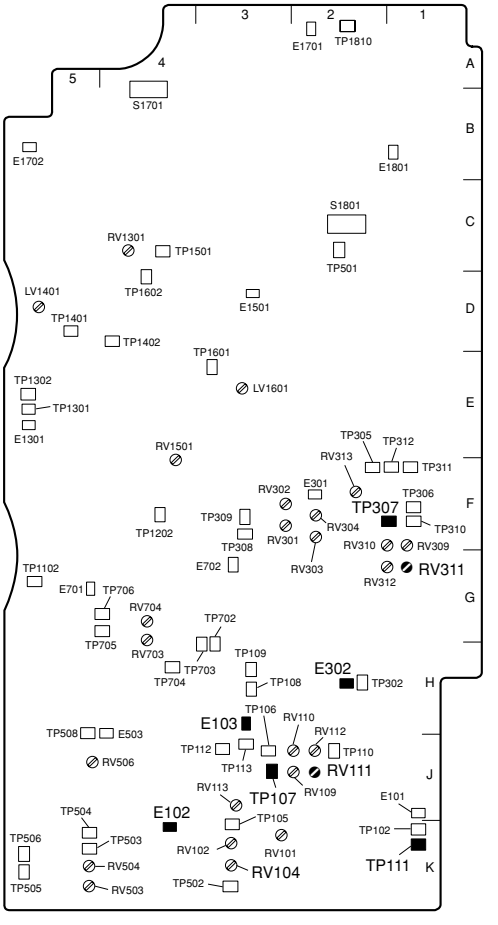


4. Stop the playback of the alignment tape.

5. In case of the 525 system, eject the alignment tape.

Note

To continue "7-2-6. OMC Carrier Balance Adjustment" in the 625 system, it is not necessary to eject the alignment tape.



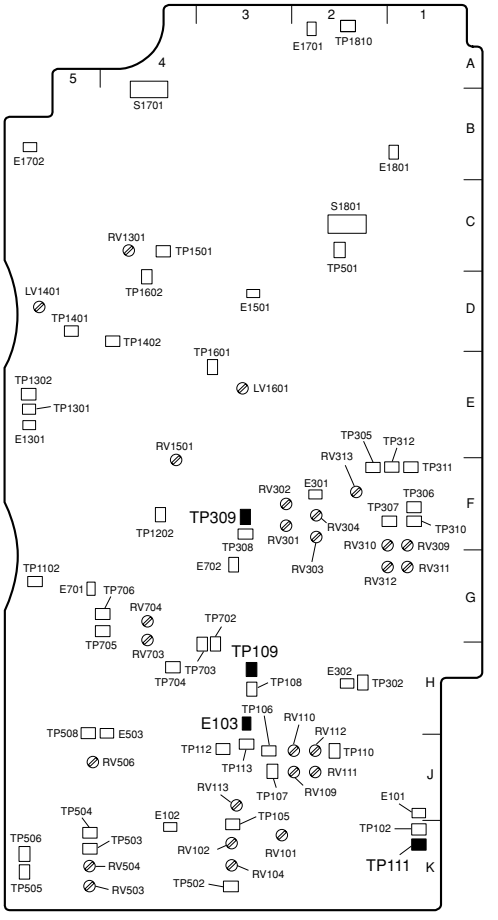
DM-124 Board (Side A)

7-2-6. OMC Carrier Balance Adjustment (Analog Betacam)

Notes

- The adjustment uses the menu exclusive for 625 system. Even if the unit is mainly used is the 525 system, change the unit to 625 video system.
- If the spectrum analyzer is not available, refer to "7-2-7. OMC Carrier Balance Provisional Adjustment".

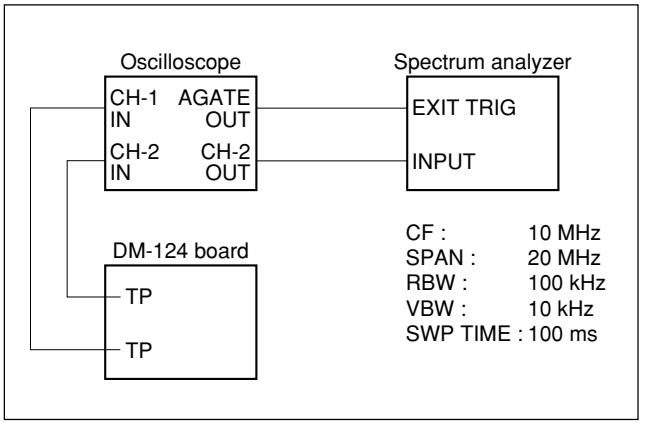
Equipment : Oscilloscope
Spectrum analyzer



DM-124 Board (Side A)

1. Preparation

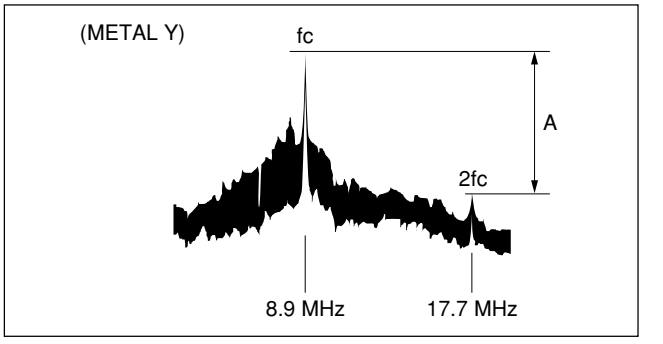
1. Connect the spectrum analyzer to the oscilloscope as follows and set it.



2. Change the unit to the 625 system.
3. Start up the maintenance mode.
4. Enter A37 : OMC LIM BALANCE VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM DM → A37 : OMC LIM BALANCE VR

2. METAL Y Adjustment

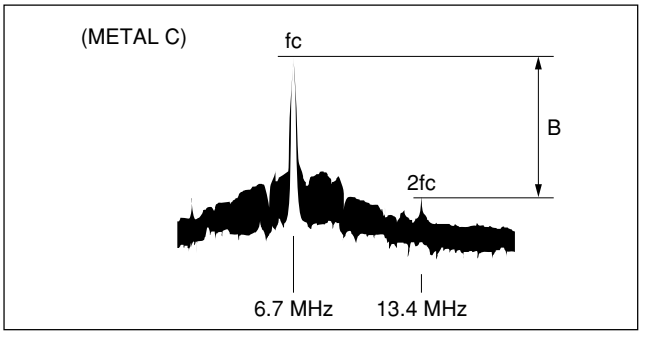
1. Connect and set the oscilloscope as follows.
   CH-1 : TP111/DM-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   CH-2 : TP109/DM-124 (H-3), AC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME : 5 ms/DIV
   TRIG : CH-1, −slope
2. Play back the flat field signal portion (24 : 00 to 26 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting locations : A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-A and OMC LIM METAL-Y-B
   Specification : A ≧ 40 dB



3. Stop the playback of the alignment tape.

3. METAL C Adjustment

1. Change only the connection of CH-2 of the oscilloscope as follows.
   (Keep the setting and the connection of CH-1 unchanged.)
   CH-2 : TP309/DM-124 (F-3)
   GND : E103/DM-124 (H-3)
2. Play back the flat field signal portion (24 : 00 to 26 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting locations : A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-A and OMC LIM METAL-C-B
   Specification : B ≧ 40 dB



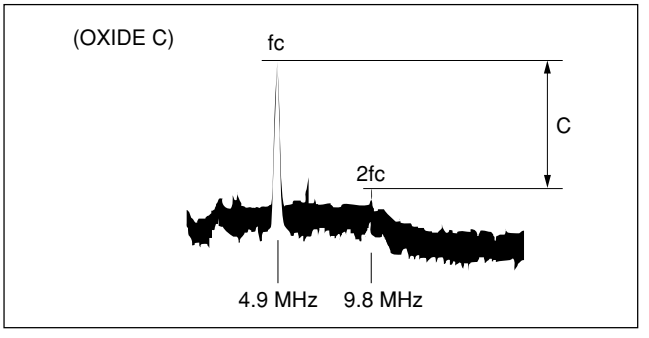
3. Stop the playback of the alignment tape and eject it (SET → EJECT → MENU).

4. OXIDE C Adjustment

Note

Keep the connection of the oscilloscope unchanged.

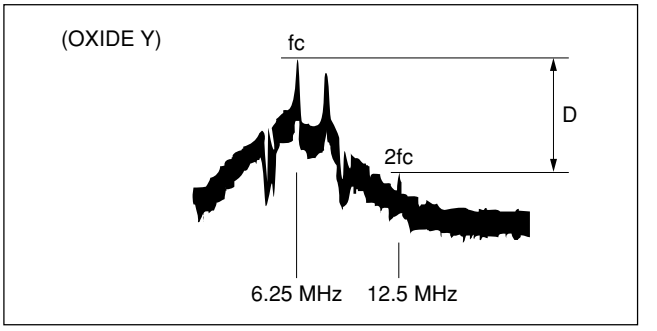
1. Play back the pulse and bars signal (09 : 00 to 11 : 00) of the alignment tape CR5-2A PS and adjust.
   Adjusting locations : A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-A and OMC LIM OXIDE-C-B
   Specification : C ≧ 35 dB



2. Stop the playback of the alignment tape.

5. OXIDE Y Adjustment

1. Change only the connection of CH-2 of the oscilloscope as follows.
   (Keep the setting and the connection of CH-1 unchanged.)
   CH-2 : TP109/DM-124 (H-3)
   GND : E103/DM-124 (H-3)
2. Play back the pulse and bars signal (09 : 00 to 01 : 00) of the alignment tape CR5-2A PS and adjust.
   Adjusting locations : A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-A and OMC LIM OXIDE-Y-B
   Specification : D ≧ 35 dB



3. Stop the playback of the alignment tape.
4. Press the MENU (SHIFT + SET) button once to exit A37 : OMC LIM BALANCE VR.

6. Data Save (Save of Adjusted Data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.
2. Terminate the maintenance mode.

7-2-7. OMC Carrier Balance Provisional Adjustment (Analog Betacam)

In this Section 7-2-7, the provisional adjustment, when the spectrum analyzer is not available, is explained.
If the "7-2-6. OMC Carrier Balance Adjustment" is performed, the provisional adjustment is not needed.

Notes

- In this adjustment, the menu exclusive for 625 system is used. When the unit is mainly used in the 525 system and the spectrum analyzer is not available, set the unit to the 625 system and perform this adjustment.
- Perform the provisional adjustment only in case of emergency or when the spectrum analyzer is not available.
  But, later, perform surely the "7-2-6. OMC Carrier Balance Adjustment" using the spectrum analyzer.

Setting of Adjustment Data

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A37 : OMC LIM BALANCE VR.
   Maintenance mode → M1 : ADJUST → A3 BETACAM DM → A37 : OMC LIM BALANCE VR
4. Change the data in the following items to the initial data.

Item (A37 : OMC LIM BALANCE VR)	Initial data
OMC LIM METAL-Y-A	78
OMC LIM METAL-Y-B	78
OMC LIM METAL-C-A	51
OMC LIM METAL-C-B	51
OMC LIM OXIDE-Y-A	78
OMC LIM OXIDE-Y-B	78
OMC LIM OXIDE-C-A	55
OMC LIM OXIDE-C-B	55

5. Press the MENU (SHIFT + SET) button once to exit A37 : OMC LIM BALANCE VR.
6. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

7. Terminate the maintenance mode.

7-2-8. Demodulator Limiter Balance Adjustment (Analog Betacam)

Equipment : Spectrum analyzer
Oscilloscope

Note

In case of emergency or when the spectrum analyzer is not available, omit "2. Y adjustment (625)".
But, later, perform "2. Y adjustment (625)" using the spectrum analyzer.

1. Adjustment in 625 System

1. Preparation

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A38 : DEMO BAL/ETC. VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM DM → A38 : DEMO BAL/ETC. VR
4. Change the data in the following items to the initial data.

Item (A38 : DEMO BAL/ETC. VR)	Initial data
DEMO BAL METAL-Y	80
DEMO BAL METAL-C	80
DEMO BAL OXIDE-Y	83
DEMO BAL OXIDE-C	83

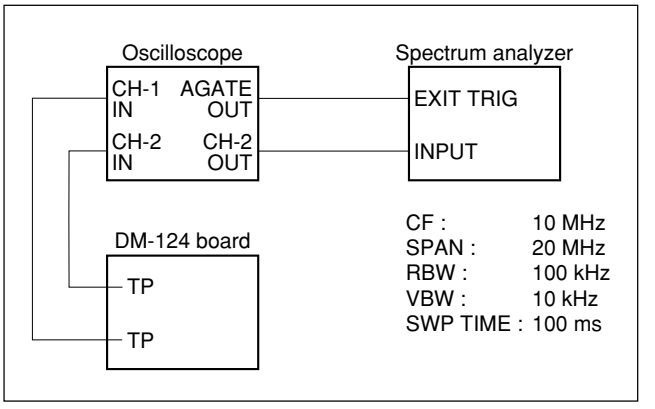
2. Y Adjustment (625)

Note

In case of emergency or when the spectrum analyzer is not available, omit "2. Y adjustment (625)".
But, later, perform "2. Y adjustment (625)" using the spectrum analyzer.

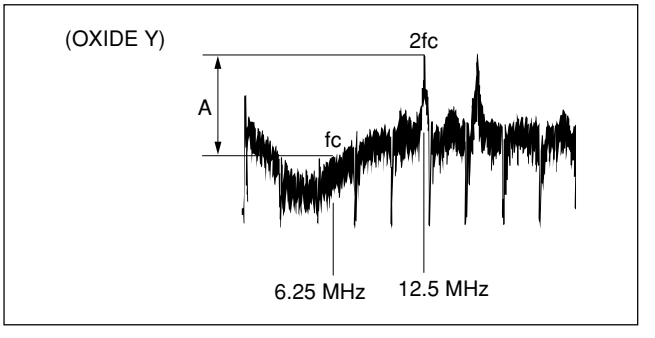
1. Connect and set the oscilloscope as follows.
   CH-1 : TP111/DM-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   CH-2 : TP502/DM-124 (K-3), AC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME : 5 ms/DIV
   TRIG : CH-1, −slope

2. Connect the spectrum analyzer to the oscilloscope as shown below and set them.



(OXIDE Y)

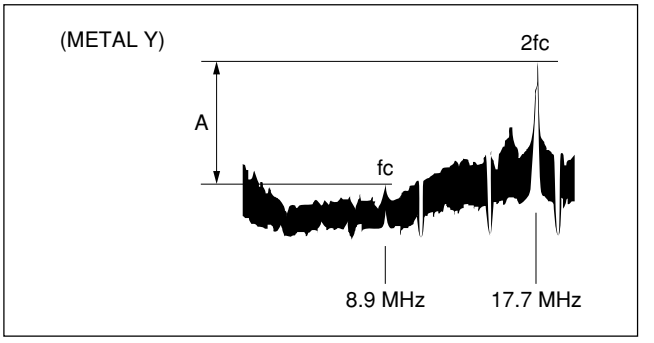
3. Play back the pulse and bars signal portion (09 : 00 to 11 : 00) of the alignment tape CR5-2A PS and adjust.
   Adjusting location : A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-Y
   Specification : Maximize "A". (Minimize "fc".)



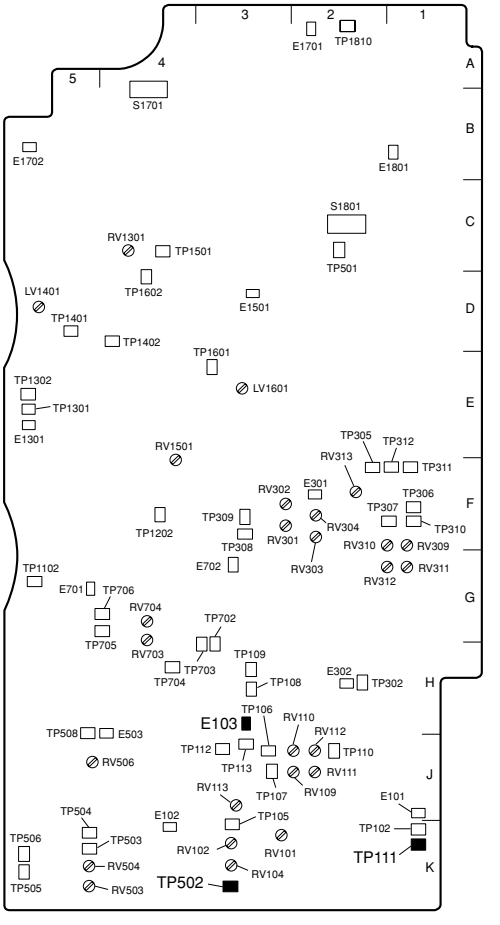
4. Stop the playback of the alignment tape and eject it (SET → EJECT → MENU).

(METAL Y)

5. Play back the flat field signal portion (24 : 00 to 26 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting location : A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-Y
   Specification : Maximize "B". (Minimize "fc".)



6. Stop the playback of the alignment tape.



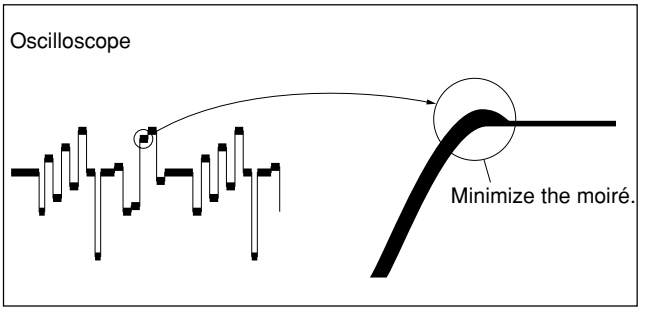
DM-124 Board (Side A)

3. C Adjustment (625)

1. Connect and set the oscilloscope as follows.
   CH-1 : TP706/DM-124 (G-4), AC 200 mV/DIV
   GND : E503/DM-124 (H-4)
   TIME : 10 µs/DIV

(METAL C)

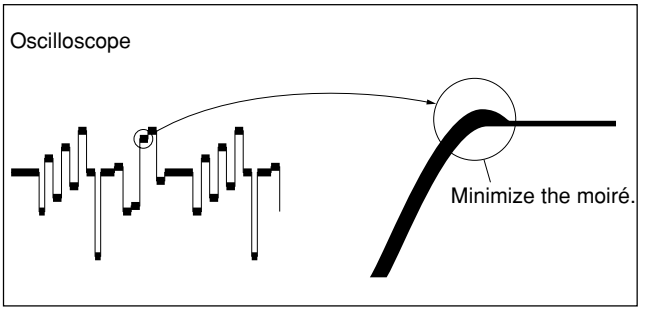
2. Play back the 100 % color bars signal portion (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting location : A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-C
   Specification : Minimize the moiré at the specified portion.



3. Stop the playback of the alignment tape and eject it (SET → EJECT → MENU).

(OXIDE C)

4. Play back the 75 % color bars signal portion (00 : 00 to 03 : 00) of the alignment tape CR5-2A PS and adjust.
   Adjusting location : A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-C
   Specification : Minimize the moiré at the specified portion.

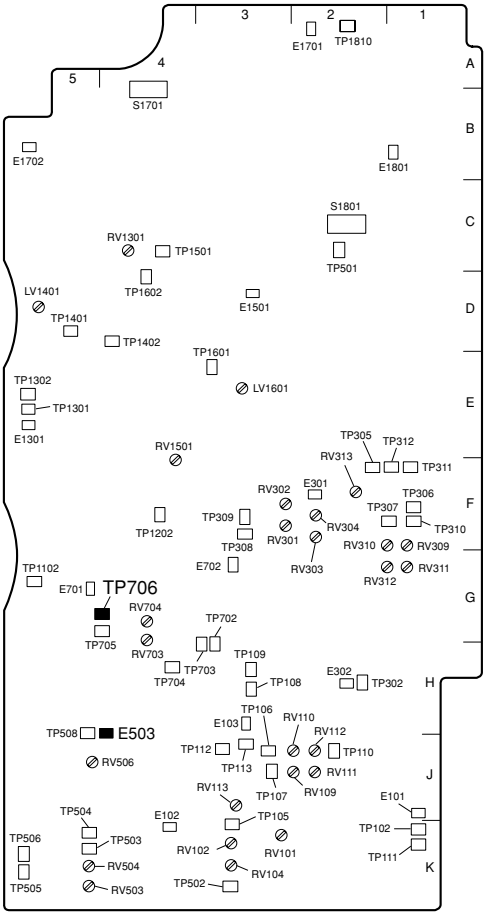


5. Stop the playback of the alignment tape.
6. Press the MENU (SHIFT + SET) button once to exit A38 : DEMO BAL/ETC. VR.

4. Data save (save of 625 adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.
3. Eject the alignment tape.



DM-124 Board (Side A)

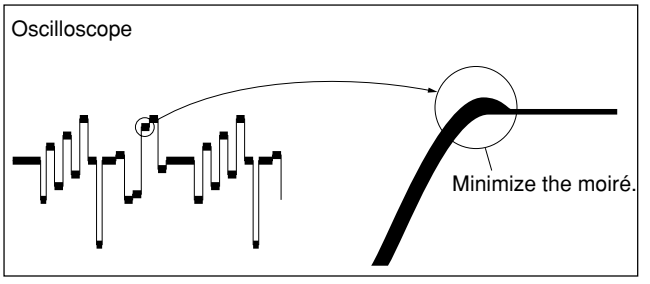
2. Adjustment in 525 System

1. C Adjustment (525)

1. Change the unit to the 525 system.
2. Start up the maintenance mode.
3. Enter A38 : DEMO BAL VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM DM → A38 : DEMO BAL VR
4. Connect and set the oscilloscope as follows.
   CH-1 : TP706/DM-124 (G-4), AC200 mV/DV
   GND : E503/DM-124 (H-4)
   TIME : 10 µs/DIV

(METAL C)

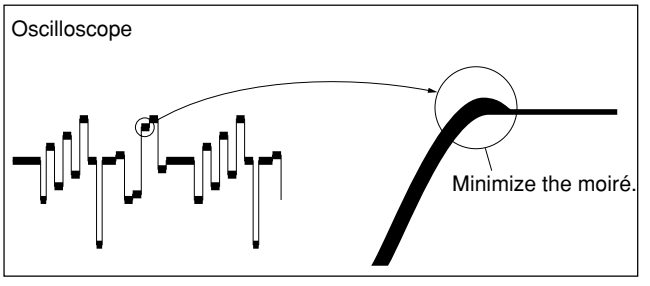
5. Play back the 75 % color bars signal portion (14 : 00 to 17 : 00) of the alignment tape CR5-1B and adjust.
   Adjusting location : A38 : DEMO BAL VR : DEMO BAL METAL-C
   Specification : Minimize the moiré at the specified portion.



6. Stop the playback of the alignment tape and eject it. (SET → EJECT → MENU)

(OXIDE C)

7. Play back the 75 % color bars signal portion (00 : 00 to 03 : 00) of the alignment tape CR5-2A and adjust.
   Adjusting location : A38 : DEMO BAL VR : DEMO BAL OXIDE-C
   Specification : Minimize the moiré at the specified portion.

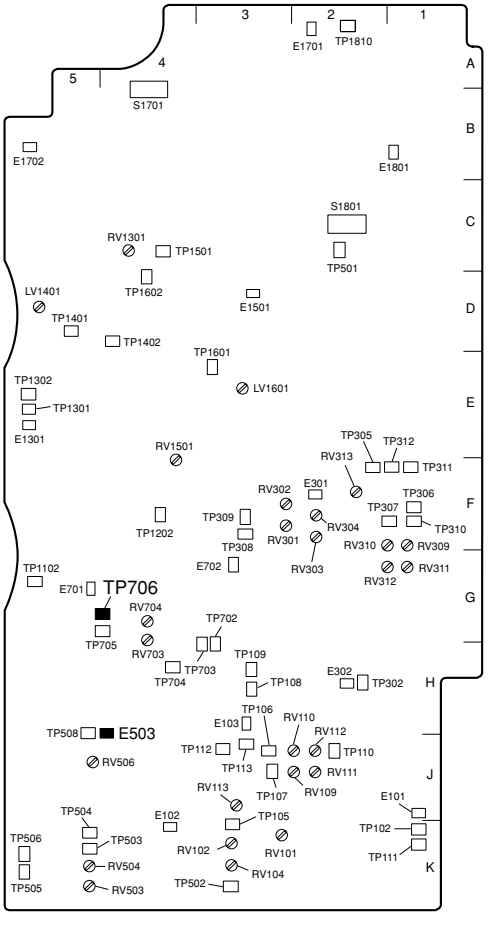


8. Stop the playback of the alignment tape.
9. Press the MENU (SHIFT + SET) button once to exit A38 : DEMO BAL VR.

2. Data save (save of 525 system adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.
3. Eject the alignment tape.



DM-124 Board (Side A)

7-2-9. Playback Frequency Characteristic Adjustment (Analog Betacam)

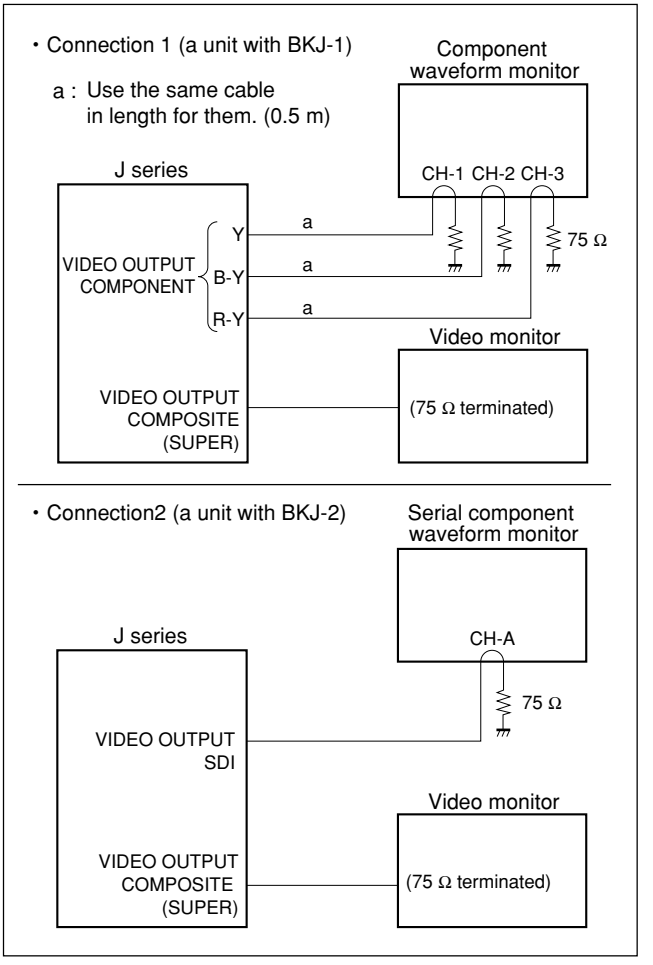
Note

Adjust in the 625 system first and then in the 525 system.

Equipment : Component waveform monitor

1. Connection of Equipment

Connect the equipment as shown below.



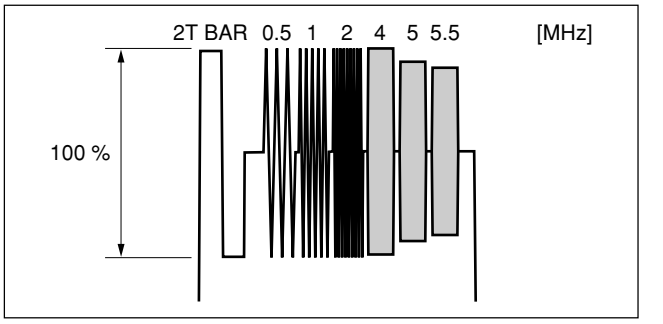
2. Adjustment in 625 System

1. Preparation

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A3 : BETACAM DM.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM DM

2. METAL Y adjustment (625)

1. Enter A31 : COS EQ VR (METAL-Y).
2. Observe the Y output signal on the waveform monitor.
   Note
   Channel A signal and channel B signal are overlapped on the waveform monitor. Adjust and check channel A signal and channel B signal respectively.
3. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS. Measure the level at 2T BAR.
   Standardize it as the reference 100 % (0 dB).
4. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and adjust the level at 5 MHz to meet the specification with respect to the reference level.
   Adjusting locations : Ch-A : A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A
   Ch-B : A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-B
   Specification : 5 MHz : 91 % (96 to 87 %) {−0.8 ±0.4 dB}
5. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check the levels at the following frequencies.
   Specifications : 0.5 MHz : 100 % (106 to 63 %) {0 $^{+0.5}_{-4.0}$ dB}
   1 MHz : 100 % (106 to 63 %) {0 $^{+0.5}_{-4.0}$ dB}
   2 MHz : 100 % (106 to 63 %) {0 $^{+0.5}_{-4.0}$ dB}
   4 MHz : 100 % (106 to 63 %) {0 $^{+0.5}_{-4.0}$ dB}
   5.5 MHz : 84 % (106 to 63 %) {−1.5 $^{+2.0}_{-2.5}$ dB}



6. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check that no flicker is observed in the play backed picture on the video monitor .
7. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL-Y).
8. Stop the playback of the alignment tape.

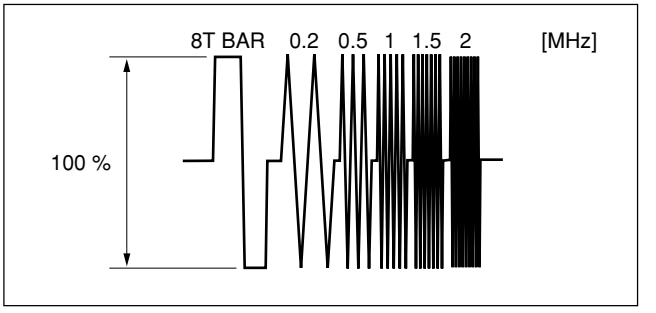
3. METAL C adjustment (625)

1. Enter A32 : COS EQ VR (METAL-C).
2. Observe the R-Y output signal on the waveform monitor.

   Note

   Channel A signal and channel B signal are overlapped on the waveform monitor. Adjust and check channel A signal and channel B signal respectively.

3. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS. Measure the level at 8T BAR.
   Standardize it as the reference 100 % (0 dB).
4. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and adjust the level at 1.5 MHz to meet the specification with respect to the reference level.
   Adjusting locations : Ch-A : A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A
   Ch-B : A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-B
   Specification : 1.5 MHz : 93 % (102 to 85 %) {−0.6 ±0.8 dB}
5. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check the levels at the following frequencies.
   Specifications : 0.2 MHz : 100 % (106 to 71 %) {0 $^{+0.5}_{-3.0}$ dB}
   0.5 MHz : 100 % (106 to 71 %) {0 $^{+0.5}_{-3.0}$ dB}
   1 MHz : 100 % (106 to 71 %) {0 $^{+0.5}_{-3.0}$ dB}
   2 MHz : 80 % (106 to 71 %) {−2.0 $^{+2.5}_{-1.0}$ dB}

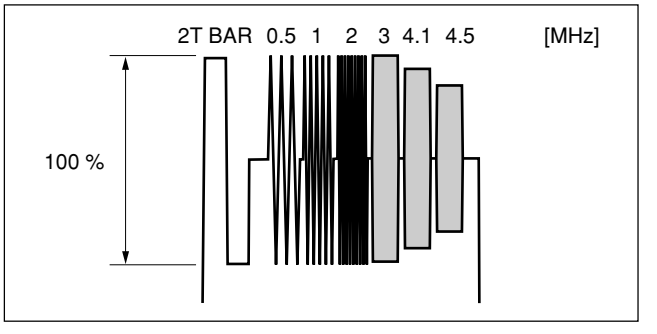


6. Observe the B-Y output signal on the waveform monitor.
7. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check that the B-Y output meets the specifications in above steps 4 and 5.
   If not met, fine-adjust so that both of R-Y and B-Y signals meet the above specifications.
8. Press the MENU (SHIFT + SET) button once to exit A32 : COS EQ VR (METAL-C).
9. Stop the playback of the alignment tape and eject it.

4. OXIDE Y adjustment (625)

1. Enter A33 : COS EQ VR (OXIDE-Y).
2. Observe the Y output signal on the waveform monitor.
   Note
   Channel A signal and channel B signal are overlapped on the waveform monitor. Adjust and check channel A signal and channel B signal respectively.

3. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS. Measure the level at 2T BAR.
   Standardize it as the reference 100 % (0 dB).
4. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and adjust the level at 3 MHz to meet the specification with respect to the reference level.
   Adjusting locations : Ch-A : A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A
   Ch-B : A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-B
   Specification : 3 MHz : 89 % (100 to 79 %) {−1.0 +1.0 dB}
5. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and check the levels at the following frequencies.
   Specification : 0.5 MHz : 100 % (106 to 50 %) {0 $^{+0.5}_{-6.0}$ dB}
   1 MHz : 100 % (106 to 50 %) {0 $^{+0.5}_{-6.0}$ dB}
   2 MHz : 100 % (106 to 50 %) {0 $^{+0.5}_{-6.0}$ dB}
   4.1 MHz : 71 % (106 to 50 %) {−3.0 $^{+3.5}_{-3.0}$ dB}



6. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and check that there is almost no difference between levels of channel A signal and channel B signal at the high frequency portion (4.5 MHz).

Note

If there is any difference between levels of channel A signal and channel B signal at the high frequency portion, adjust "SUB OXIDE-Y-A" or "SUB OXIDE-Y-B" in A33 : COS EQ VR (OXIDE-Y).
In this case, while playing back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS, adjust the low level channel, performing the following steps (1) and (2).

(1) Change data of "SUB OXIDE-Y-A" (channel A signal) to check which channel level is low.
(2) If the channel B signal level is low, set data of "SUB OXIDE-Y-A" back to the original value. Then, increase the data of "SUB OXIDE-Y-B" (channel B signal side) so that the level difference is eliminated. If the channel A signal level is low, decrease the data of "SUB OXIDE-Y-A" (channel A signal side) so that the level differences is eliminated.

7. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE-Y).
8. Stop the playback of the alignment tape.

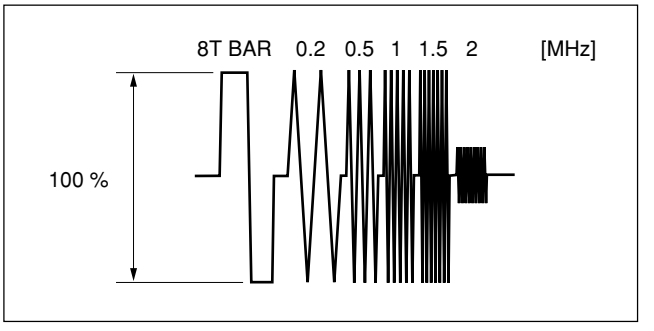
5. OXIDE C adjustment (625)

1. Enter A34 : COS EQ VR (OXIDE-C).
2. Observe the R-Y output signal on the waveform monitor.

Note

Channel A signal and channel B signal are overlapped on the waveform monitor. Adjust and check channel A signal and channel B signal respectively.

3. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS. Measure the level at 8T BAR.
Standardize it as the reference 100 % (0 dB).
4. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and adjust the level at 1 MHz to meet the specification with respect to the reference level.
Adjusting locations : Ch-A : A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A
Ch-B : A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-B
Specification : 1 MHz : 94 % (102 to 86 %) {−0.5 ±0.8 dB}
5. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and check the levels at the following frequencies.
Specifications : 0.2 MHz : 100 % (106 to 71 %) {0 $^{+0.5}_{-3.0}$ dB}
0.5 MHz : 100 % (106 to 71 %) {0 $^{+0.5}_{-3.0}$ dB}
1.5 MHz : 84 % (106 to 71%) {−1.5 $^{+2.0}_{-1.5}$ dB}



6. Observe the B-Y output signal on the waveform monitor.
7. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and check that the B-Y output meets the specifications in above steps 4 and 5.
   If not met, fine-adjust so that both of R-Y and B-Y signals meet the above specifications.
8. Press the MENU (SHIFT + SET) button once to exit A34 : COS EQ VR (OXIDE-C).
9. Stop the playback of the alignment tape and eject it.

6. Data save (save of 625 system adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

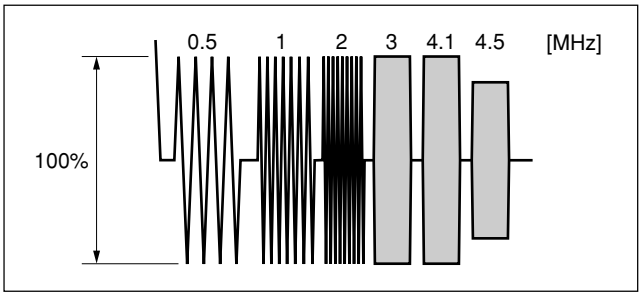
3. Adjustment in 525 System

1. Preparation

1. Change the unit to the 525 system.
2. Start up the maintenance mode.
3. Enter A3 : BETACAM DM.
   Maintenance mode → M1 : ADJUST→ A3 : BETACAM DM

2. METAL Y adjustment (525)

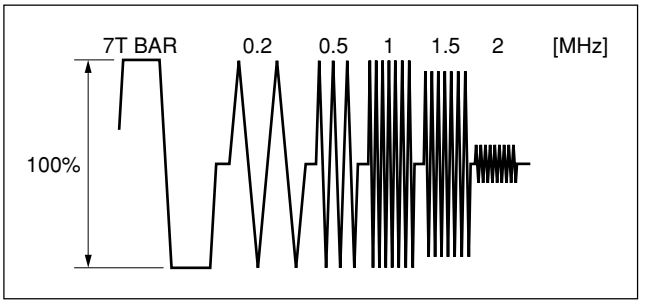
1. Enter A31 : COS EQ VR (METAL).
2. Observe the Y output signal on the waveform monitor.
   Note
   Channel A signal and channel B signal are overlapped on the waveform monitor. Adjust and check channel A signal and channel B signal respectively.
3. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B. Measure the level at 0.5 MHz.
   Standardize it as the reference 100 % (0 dB).
4. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B and adjust the level 4.1 MHz to meet the specification with respect to the reference level.
   Adjusting locations : Ch-A : A31 : COS EQ VR (METAL) : EQ1 METAL-Y-A
   Ch-B : A31 : COS EQ VR (METAL) : EQ1 METAL-Y-B
   Specification : 4.1 MHz : 94 % (100 to 90 %) {$-0.5\ ^{+0.5}_{-0.4}$ dB}
5. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B and check the levels at the following frequencies.
   Specifications : 1 MHz : 100 % (106 to 63 %) {$0\ ^{+0.5}_{-4.0}$ dB}
   2 MHz : 100 % (106 to 63 %) {$0\ ^{+0.5}_{-4.0}$ dB}
   3 MHz : 100 % (106 to 63 %) {$0\ ^{+0.5}_{-4.0}$ dB}
   4.5 MHz : 80 % (106 to 63 %) {$-2.0\ ^{+2.5}_{-2.0}$ dB}



6. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B and check that no flicker is observed in the play backed picture on the video monitor.
7. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL).
8. Stop the playback of the alignment tape.

3. METAL C adjustment (525)

1. Enter A31 : COS EQ VR (METAL).
2. Observe the R-Y output signal on the waveform monitor.
   Note
   Channel A signal and channel B signal are overlapped on the waveform monitor. Adjust and check channel A signal and channel B signal respectively.
3. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B. Measure the level at 7T BAR.
   Standardize it as the reference 100 % (0 dB).
4. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B and adjust the level at 1 MHz to meet the specification with respect to the reference level.
   Adjusting locations : Ch-A : A31 : COS EQ VR (METAL) : EQ1 METAL-C-A
   Ch-B : A31 : COS EQ VR (METAL) : EQ1 METAL-C-B
   Specification : 1 MHz : 94 % (100 to 89 %) {-0.5 ± 0.5 dB}
5. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B and check the levels at the following frequencies.
   Specifications : 0.2 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   0.5 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   1.5 MHz : 80 % (106 to 71 %) {$-2.0\ ^{+2.5}_{-1.0}$ dB}

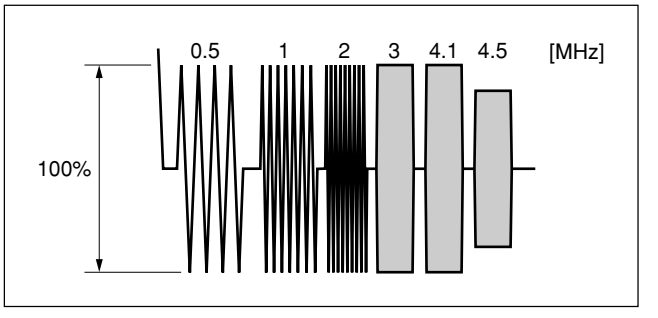


6. Observe the B-Y output signal on the waveform monitor.
7. Play back the multi-burst signal portion (08 : 00 to 11 : 00) of the alignment tape CR5-1B and check that the B-Y output meets the specifications above in steps 4 and 5.
   If not met, fine-adjustment so that both of R-Y and B-Y signals meet the above specifications.
8. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL).
9. Stop the playback of the alignment tape and eject it.

4. OXIDE Y adjustment (525)

1. Enter A33 : COS EQ VR (OXIDE).
2. Observe the Y output signal on the waveform monitor.
   Note
   Channel A signal and channel B signal are overlapped on the waveform monitor. Adjust and check channel A signal and channel B signal respectively.

3. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A. Measure the level at 0.5 MHz.
   Standardize it as the reference 100 % (0 dB).
4. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A and adjust the level at 2 MHz to meet the specification with respect to the reference level.
   Adjusting locations : Ch-A : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-A
   Ch-B : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-B
   Specification : 2 MHz : 100 % (104 to 95 %) {0 $^{+3.0}_{-0.4}$ dB}
5. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A and check the levels at the following frequencies.
   Specifications : 1 MHz : 100 % (106 to 50 %) {0 $^{+0.5}_{-6.0}$ dB}
   3 MHz : 89 % (106 to 50 %) {−1.0 $^{+1.5}_{-5.0}$ dB}
   4.1 MHz : 71 % (106 to 50 %) {−3.0 $^{+3.5}_{-3.0}$ dB}



6. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A and check that there is almost no difference between output levels of channel A signal and channel B signal at the high frequency portion (4.5 MHz).

Note

If there is any difference between levels of channel A signal and channel B signal at the high frequency portion, adjust "SUB OXIDE-Y-A" or "SUB OXIDE-Y-B" in A33 : COS EQ VR (OXIDE).
In this case, while playing back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A, adjust the low level channel, performing the following steps (1) and (2).

(1) Change data of "SUB OXIDE-Y-A" (channel A signal) to check which channel level is low.
(2) If the channel B signal level is low, set data of "SUB OXIDE-Y-A" back to the original value. Then, increase the data of "SUB OXIDE-Y-B" (channel B signal side) so that the level difference is eliminated. If the channel A signal level is low, increase the data of "SUB OXIDE-Y-A" (channel A signal side) so that the level differences are eliminated.

7. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE).
8. Stop the playback of the alignment tape.

5. OXIDE C adjustment (525)

1. Enter A33 : COS EQ VR (OXIDE).
2. Observe the R-Y output signal on the waveform monitor.

Note

Channel A signal and channel B signal are overlapped on the waveform monitor. Adjust and check channel A signal and channel B signal respectively.

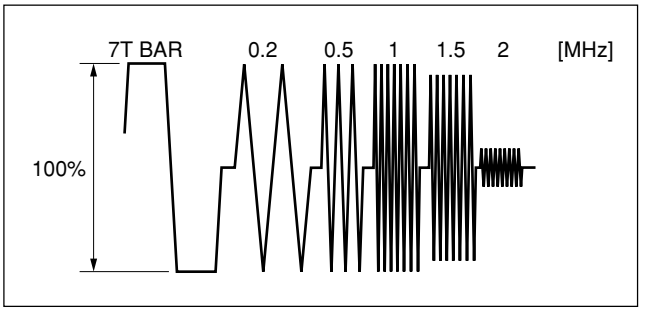
3. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A. Measure the level at 7T BAR.
Standardize it as the reference 100 % (0 dB).
4. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A and adjust the level at 1 MHz to meet the specification with respect to the reference level.

Adjusting locations : Ch-A : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-A
Ch-B : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-B

Specification : 1 MHz : 94 % (100 to 89 %) {−0.5 ±0.5 dB}

5. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A and check the levels at the following frequencies.

Specifications : 0.2 MHz : 100 % (106 to 71 %) $\{0\ ^{+0.5}_{-3.0}\ \mathrm{dB}\}$
0.5 MHz : 95 % (106 to 71 %) $\{-0.4\ ^{+0.9}_{-2.6}\ \mathrm{dB}\}$
1.5 MHz : 80 % (106 to 71 %) $\{-2.0\ ^{+2.5}_{-1.0}\ \mathrm{dB}\}$



6. Observe the B-Y output signal on the waveform monitor.
7. Play back the multi-burst signal portion (03 : 00 to 06 : 00) of the alignment tape CR5-2A and check that the B-Y output meets the specifications in above steps 4 and 5.
   If not met, fine-adjust so that both of R-Y and B-Y signal levels meet the above specifications.
8. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE).
9. Stop the playback of the alignment tape and eject it.

6. Data save (save of 525 adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

7-2-10. DM RF Output Level Re-adjustment (Analog Betacam)

In the same manner as in Section 7-2-5, adjust the DM RF output level again.

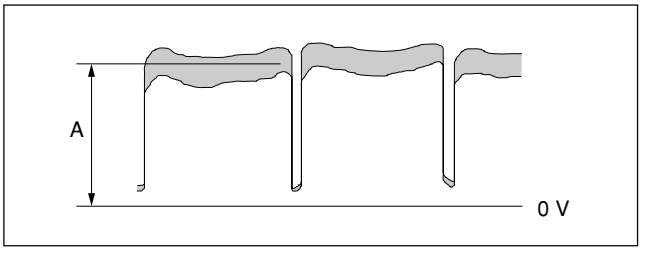
7-2-11. RF Envelope Adjustment (Analog Betacam)

Perform this adjustment in the mainly used video system.

Equipment : Oscilloscope

1. Y Adjustment

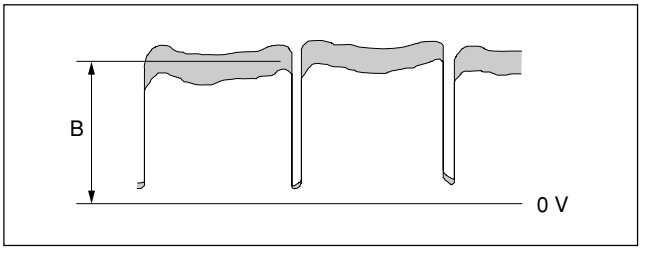
1. Connect and set the oscilloscope as follows.
   CH-1 : TP112/DM-124 (J-3), DC 500 mV/DIV
   GND : E101/DM-124 (J-1)
   CH-2 : TP111/DM-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME : 5 ms/DIV
   TRIG : CH-2, −slope
2. Play back the flat field signal portion (24 : 00 to 26 : 00) of the following alignment tape and adjust.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
   Adjusting location : ⊘RV113/DM-124 (J-3)
   Specification : A = 2.0 ±0.2 V dc



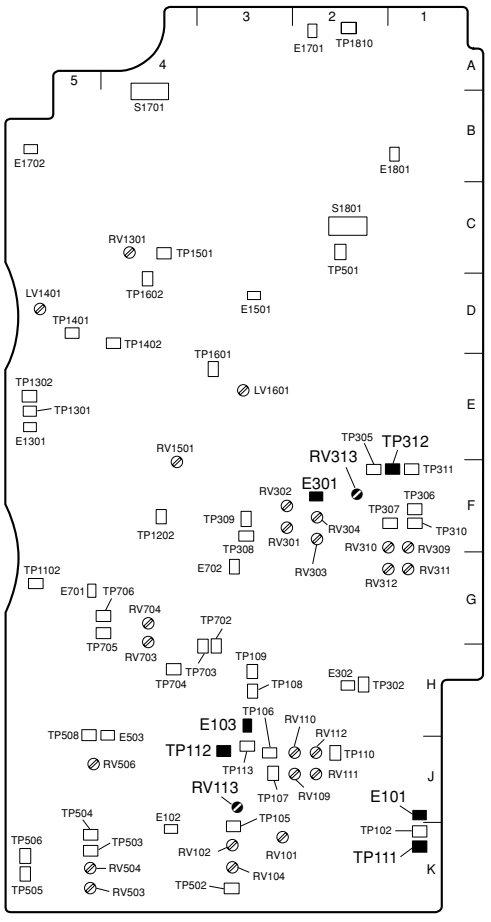
3. Stop the playback of the alignment tape.

2. C Adjustment

1. Change only the CH-1 connection of the oscilloscope as follows.
   (Keep the setting and CH-2 connection unchanged.)
   CH-1 : TP312/DM-124 (F-1)
   GND : E301/DM-124 (F-2)
2. Play back the flat field signal portion (24 : 00 to 26 : 00) of following alignment tape and adjust.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
   Adjusting location : ⊘RV313/DM-124 (F-2)
   Specification : B = 2.0 ±0.2 V dc



3. Stop the playback of the alignment tape and eject it.



DM-124 Board (Side A)

3. Threshold Level Setting (Check) (Perform in the 625 system.)

Note

This adjustment uses the menu exclusive for 625 system. Even if the unit is mainly used in the 525 system, change the unit to the 625 system to perform this check.

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A36 : DO TH/ENV TH VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM DM → A36 : DO TH/ENV TH VR
4. Check that the specified data are set in the items of A36 : DO TH/ENV TH VR.

Item (A36 : DO TH/ENV TH VR)	Setting data
ENV-TH-A	20
ENV-TH-B	20

5. Press the MENU (SHIFT + SET) button once to exit A36 : DO TH/ENV TH VR.

Data save (save of adjusted data)

Perform step 6 only when data is changed in step 4.

6. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

7. Terminate the maintenance mode.

7-2-12. TBC Y/C Delay Adjustment (Analog Betacam)

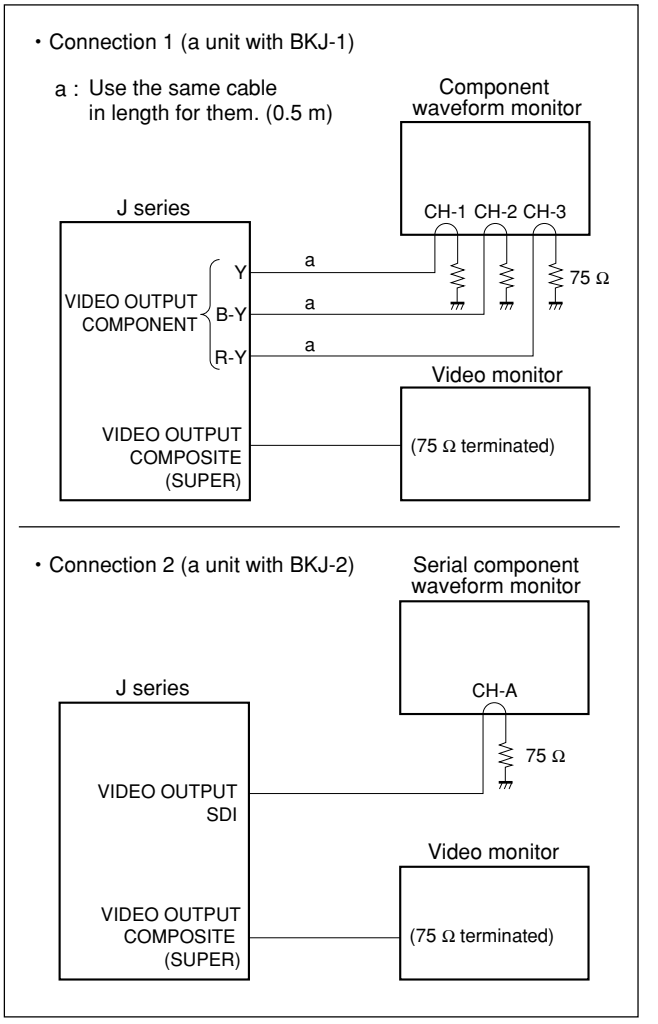
Note

Perform this adjustment in the 525 system after the adjustment in the 625 system.

Equipment : Component waveform monitor.

1. Connection of Equipment

Connect the equipment as follows.



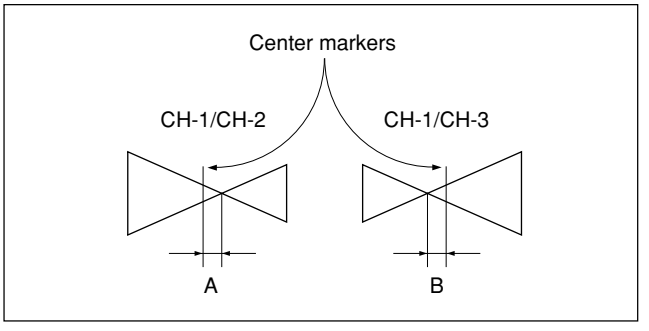
2. Adjustment in 625 System

1. Preparation

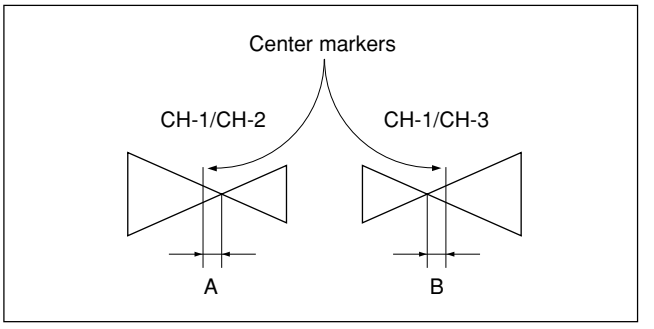
1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A42 : YC DL/Y TR VR.
   Maintenance mode → M1 : ADJUST → A4 : BETA-CAM TBC → A42 : YC DL/Y TR VR

2. METAL adjustment (625)

1. Set the component waveform monitor to the BOWTIE mode.
2. Play back the BOWTIE signal portion (17 : 00 to 19 : 00) of the alignment tape CR5-1B PS.
3. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the differences between bowtie dip points and the center markers meet the specifications.
   Adjusting locations : Field 1 : A42 : YC DL/Y TR VR : Y/C DELAY M-A
   Field 2 : A42 : YC DL/Y TR VR : Y/C DELAY M-B
   Specifications : A = 0 ± 10 ns
   B = 0 ± 10 ns



4. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the difference between bowtie dip points and the center markers meets the specification.
   Adjusting location : ⊘RV1501/DM-124 (F-4)
   Specification : A − B = 0 ± 10 ns



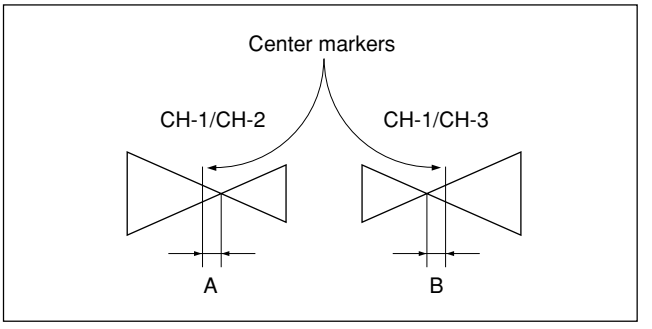
If not met the specification, re-adjust after performing the following steps (1) to (7).
But, perform only when the adjustments in steps 4 and 5 fail.

(1) Press the MENU (SHIFT + SET) button once to exit A42 : YC DL/Y TR VR.
(2) Enter A40 : TBC IC DATA.
(3) Play back the BOWTIE signal portion (17 : 00 to 19 : 00) of the alignment tape CR5-1B PS.
(4) Increment or decrement data (+2 or −2) in "SQ-C RZ" of A40 : TBC IC DATA so that the cross points of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y) approaches the center markers.
(5) Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.
(6) Enter A42 : YC DL/Y TR VR.
(7) Perform steps 3 and 4 again.

5. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL/Y TR VR.
6. Stop the playback of the alignment tape and eject (SET → EJECT → MENU).

3. OXIDE adjustment (625)

1. Play back the BOWTIE signal portion (06 : 00 to 09 : 00) of the alignment tape CR5-2A PS.
2. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the differences between bowtie dip points and the center markers meet the specification.
   Adjusting locations : Field 1 : A42 : YC DL/Y TR VR : Y/C DELAY O-A
   Field 2 : A42 : YC DL/Y TR VR : Y/C DELAY O-B
   Specifications : A = 0 ± 10 ns
   B = 0 ± 10 ns



3. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL/Y TR VR.
4. Eject the alignment tape.

4. Data save (save of 625 system adjusted data)

1. Enter A4F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

3. Adjustment in 525 System

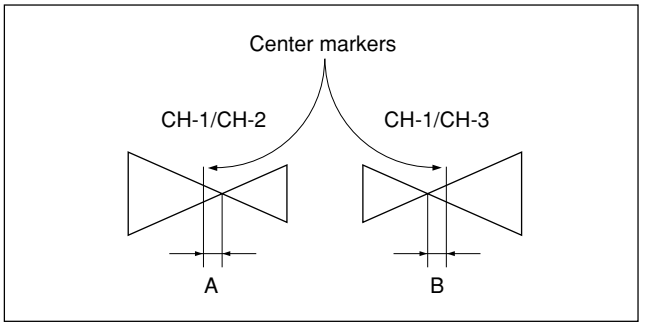
1. Preparation

1. Change the unit to the 525 system.
2. Change the setting of the setup extended menu.
   ITEM-713 : VIDEO SETUP REFERENCE LEVEL
   (Customer setting : _____) → 0.0 %

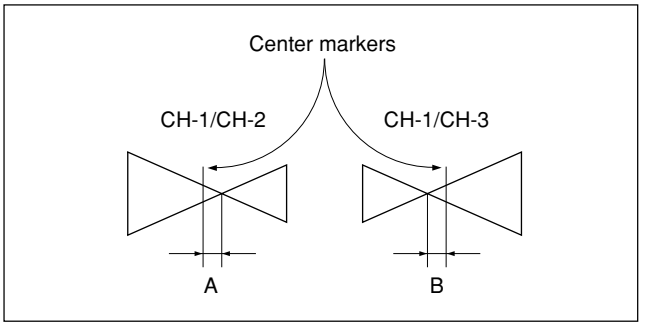
3. Start up the maintenance mode.
4. Enter A42 : YC DL VR.
   Maintenance mode → M1 : ADJUST → A4 : BETACAM TBC → A42 : YC DL VR

2. METAL adjustment (525)

1. Set the component waveform monitor to the BOWTIE mode.
2. Play back the BOWTIE signal portion (17 : 00 to 19 : 00) of the alignment tape CR5-1B.
3. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the differences between bowtie dip points and the center markers meet the specifications.
   Adjusting locations : Field 1 : A42 : YC DL VR : Y/C DELAY M-A
   Field 2 : A42 : YC DL VR : Y/C DELAY M-B
   Specification : A = 0 ± 10 ns
   B = 0 ± 10 ns



4. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the difference between bowtie dip points and the center markers meets the specification.
   Adjusting location : ⊘RV1501/DM-124 (F-4)
   Specification : A − B = 0 ± 10 ns



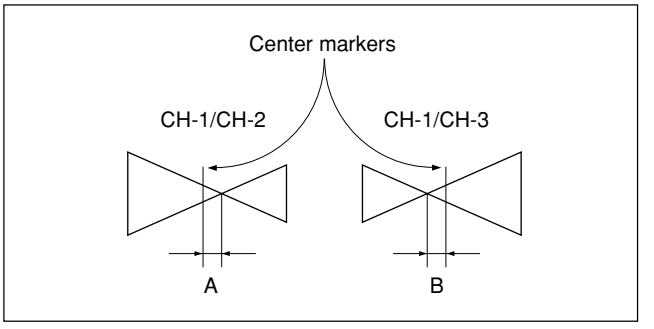
If not met the specification, re-adjust after performing the following steps (1) to (7).
But, perform only when the adjustments in steps 3 and 4 fail.

(1) Press the MENU (SHIFT + SET) button once to exit A42 : YC DL VR.
(2) Enter A40 : TBC IC DATA.
(3) Play back the BOWTIE signal portion (17 : 00 to 19 : 00) of the alignment tape CR5-1B.
(4) Increment or decrement data (+2 or −2) in "SQ-C RZ" of A40 : TBC IC DATA so that the cross points of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y) approaches the center markers.
(5) Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.
(6) Enter A42 : YC DL VR.
(7) Perform steps 3 and 4 again.

5. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL VR.
6. Stop the playback of the alignment tape and eject (SET → EJECT → MENU).

3. OXIDE adjustment (525)

1. Play back the BOWTIE signal portion (06 : 00 to 09 : 00) of the alignment tape CR5-2A.
2. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the differences between bowtie dip points and the center markers meet the specifications.
   Adjusting locations : Field 1 : A42 : YC DL VR : Y/C DELAY O-A
   Field 2 : A42 : YC DL VR : Y/C DELAY O-B
   Specifications : A = 0 ± 10 ns
   B = 0 ± 10 ns



3. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL VR.
4. Eject the alignment tape.

4. Data save (save of 525 system adjusted data)

1. Enter A4F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

5. Setting of setup extended menu

Set the setting of the following setup menu to the customer's setting
ITEM-713 : VIDEO SETUP REFERENCE LEVEL

7-3. Electrical Adjustment after Replacing the AT Head

7-3-1. Outline of Electrical Adjustment

When the AT head was replaced, perform this adjustment.
The items and the order of the adjustments are listed in the follows:

Equipment/Fixtures

To the electrical adjustment after the replacing the AT head, the following equipment (or equivalent) and fixtures are needed.

Audio analyzer **Note** Select the 80 kHz low-pass input filter to ON always during measurement.		AUDIO PRECISION System One (or System Two) or TEKTRONIX AA501A Option 02	
Audio level meter		HEWLETT-PACKARD HP3400A	
Oscilloscope		TEKTRONIX TDS460A	
Extension board		EX-811	(Part No. A-8328-372-A)
Alignment tape	525 system	CR8-1A	(Part No. 8-960-097-45)
		SR5-1	(Part No. 8-960-075-01)
	625 system	CR8-1A PS	(Part No. 8-960-096-86)
		SR5-1P	(Part No. 8-960-075-51)

Adjustment Items

Section	Item		Adjusting location	Measuring location
7-3-2	Preparation			
7-3-3	LAU playback system adjustment			
	1. LAU PB frequency response adjustment (OXIDE) (Head damping adjustment)	CH1	⊘RV203, ⊘RV202, S202 (IF-808/826 board)	MONITOR OUTPUT L
		CH2	⊘RV204, ⊘RV201, S201 (IF-808/826 board)	MONITOR OUTPUT R
	2. LAU PB frequency response adjustment (METAL)	CH1	⊘RV205 (IF-808/826 board)	MONITOR OUTPUT L
		CH2	⊘RV206 (IF-808/826 board)	MONITOR OUTPUT R
	3. LAU Dolby level adjustment	CH1	⊘RV207 (IF-808/826 board)	TP201 (IF-808/826 board)
		CH2	⊘RV208 (IF-808/826 board)	TP202 (IF-808/826 board)
	4. LAU PB level adjustment	CH1	⊘RV209 (IF-808/826 board)	MONITOR OUTPUT L
		CH2	⊘RV210 (IF-808/826 board)	MONITOR OUTPUT R
7-3-4	Time code system check			
	LTC PB level check		check	TP101 (DR-432 board)

7-3-2. Preparation

Before performing the adjustment, set switches on the boards and control panel.
After completing the adjustment, set them back to the user's settings.

1. IF-808/826 board extension

(Refer to Section 1-17.)

2. IF-808/826 board switch setting

Set the switches on the IF-808/826 board to the factory-setting.

Note

When removing boards or changing the switch setting, turn off the power switch.

Board	Ref. No.	(Address)	Item	Customer's setting		Factory setting
IF-808/826	S101	(C-2)	Analog audio output level	_____	⇨	+4 dBm

3. Video system check

Perform the adjustment of J series in the mainly used video system.
If the video system of the unit is not appropriate, change the video system in the setup menu ITEM-013 : 525/625 SYSTEM SELECT. (Refer to the "Basic Menu" in the Operation Manual.)

Note

When a unit is used in both 525 and 625 systems, perform the adjustment in the 625 video system.

4. Other setting

Location	Setting location		Customer's setting		Setting adjustment
Control panel	Monitor signal (AU MON SEL)	L	_____	⇨	CH1
		R	_____	⇨	CH2
	DOLBY C NR (SHIFT + AU MON SEL)		_____	⇨	NR OFF (lights off)
Maintenance menu	M370 : METER HEAD ROOM		_____	⇨	20 dB

5. Warming-up

Warm up the unit and equipment through the power for 20 minutes or more before starting the adjustments.

7-3-3. LAU Playback System Adjustment

1. LAU PB Frequency Response Adjustment (OXIDE)

Equipment : Audio analyzer

1. Set the audio analyzer as follows.
   Measuring mode : dB RATIO
   Input filter : 80 kHz LPF

CH1 adjustment

2. Connect the input of the audio analyzer to the MONITOR OUTPUT L connector.
3. While playing back the portion specified below (−20 VU) of the following alignment tape, perform the checks and adjustments.
   525 system : CR8-1A
   625 system : CR8-1A PS

   Note

   When adjusting RV202, if the specification is not met, change the setting of S202 (B-1) and adjust again.

CH2 adjustment

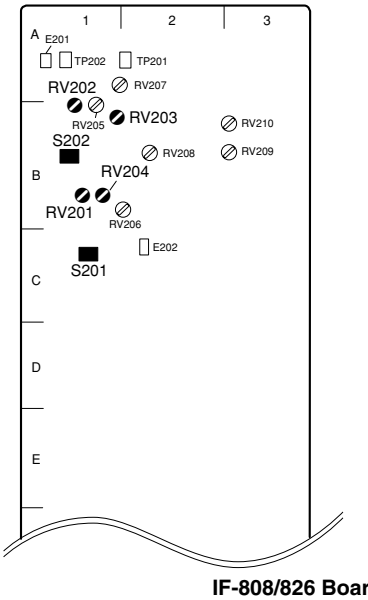
4. Connect the input o the audio analyzer to the MONITOR OUTPUT R connector.
3. While playing the portions shown below (−20 VU) of the following alignment tape, perform the checks and adjustments.
   525 system : CR8-1A
   625 system : CR8-1A PS

   Note

   When adjusting RV201, if the specification is not met, change the setting of S201 (C-1) and adjust again.

Play back portion	Specification [dB]		CH1 adjusting location	CH2 adjusting location
	525 system	625 system		
5:00 to 5:55 (1 kHz)	The measured value is standardized as a reference (0 dB).	The measured value is standardized as a reference (0 dB).	–	–
6:00 to 6:25 (40 Hz)	Correction value ±3.0	Correction value ±3.0	Check only	Check only
6:30 to 6:55 (7 kHz)	Correction value ±0.3	Correction value ±0.4	◓RV203 (B-1)	◓RV204 (B-1)
7:00 to 7:25 (10 kHz)	Correction value ±0.3	Correction value ±0.4	Check only	Check only
7:30 to 7:55 (15 kHz)	Correction value $^{+0.3}_{-1.0}$	Correction value $^{-1.0}_{-1.7}$	◓RV202 (B-1)	◓RV201 (B-1)

The correction values are described on the label affixed on the alignment tape cassette.



IF-808/826 Board (Side B)

2. LAU PB Frequency Response Adjustment (METAL)

Equipment : Audio analyzer

Note

In case of the 625 video system, perform the following adjustments. In case of the 525 video system, set ⊘RV205 (B-1) and ⊘RV206 (B-1) to the mechanical center.

1. Set the audio analyzer as follows.
   Measuring mode : dB RATIO
   Input filter : 80 kHz LPF

CH1 adjustment

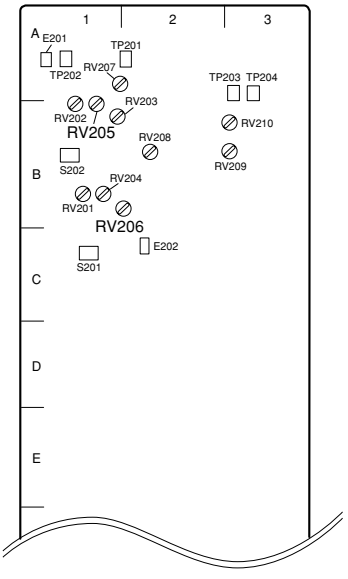
2. Connect the input of the audio analyzer to the MONITOR OUTPUT L connector.
3. While playing back the portion specified below (−20 VU) of the alignment tape CR8-1B PS, perform the checks and adjustment.

CH2 adjustment

4. Connect the input o the audio analyzer to the MONITOR OUTPUT R connector.
3. While playing back the portion specified below (−20 VU) of the alignment tape CR8-1B PS, perform the checks and adjustment.

Play back portion	Specification [dB]	CH1 adjusting location	CH2 adjusting location
5:00 to 5:55 (1 kHz)	The measured value is standardized as a reference (0 dB).	–	–
6:00 to 6:25 (40 Hz)	Correction value ±3.0	Check only	Check only
6:30 to 6:55 (7 kHz)	Correction value ±0.3	Check only	Check only
7:00 to 7:25 (10 kHz)	Correction value ±0.4	Check only	Check only
7:30 to 7:55 (15 kHz)	Correction value ±0.5	⊘RV205 (B-1)	⊘RV206 (B-1)

The correction values are described on the label affixed on the alignment tape.



IF-808/826 Board (Side B)

3. LAU Dolby Level Adjustment

Equipment : Audio level meter

CH-1 adjustment

1. Connect the audio level meter to TP201 (A-2).
   GND : E201 (A-1)
2. Play back the 1 kHz, 0 VU signal portion (00 : 00 to 02 : 55) of the following alignment tape.
   525 system : CR8-1A
   625 system : CR8-1A PS
3. Check the level on the audio level meter and the perform the adjustment.
   Adjusting location : ⊘RV207 (A-1)
   Specification : −10.0 ±0.2 dBu
   (0 dBu ≒ 0.775 V rms)

CH-2 adjustment

4. Connect the audio level meter to TP202 (A-1).
   GND : E201 (A-1)
5. Play back the 1 kHz, 0 VU signal portion (00 : 00 to 02 : 55) of the following alignment tape.
   525 system : CR8-1A
   625 system : CR8-1A PS
6. Check the level on the audio level meter and the perform the adjustment.
   Adjusting location : ⊘RV208 (B-2)
   Specification : −10.0 ±0.2 dBu
   (0 dBu ≒ 0.775 V rms)

4. LAU PB Level Adjustment

Equipment : Audio analyzer

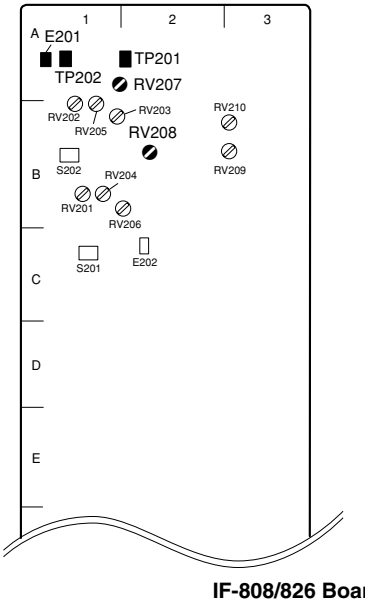
1. Set the audio analyzer as follows.
   Measuring mode : LEVEL, dBm (600 Ω)
   Input filter : 80 kHz LPF

CH2 adjustment

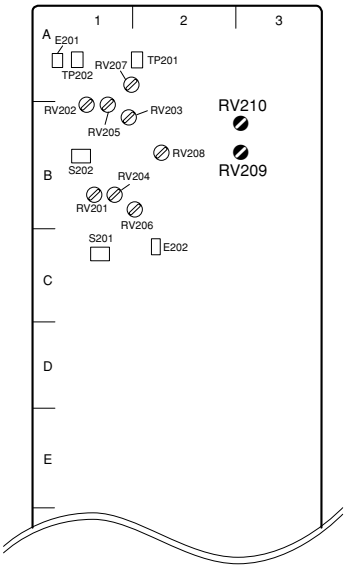
2. Connect the input of the audio analyzer to the MONITOR OUTPUT R connector.
3. Play back the 1 kHz, 0 VU signal portion (00 : 00 to 02 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1A PS
4. Check the level on the audio analyzer and perform the adjustment.
   Adjusting location : ⊘RV210 (B-3)
   Specification : +4.0 ±0.2 dBm
   (with 600 Ω loaded.)

CH1 adjustment

5. Connect the input of the audio analyzer to the MONITOR OUTPUT L connector.
6. Play back the 1 kHz, 0 VU signal portion (00 : 00 to 02 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1B PS
7. Check the level on the audio analyzer and perform the adjustment.
   Adjusting location : ⊘RV209 (B-3)
   Specification : +4.0 ±0.2 dBm
   (with 600 Ω loaded.)



IF-808/826 Board (Side B)



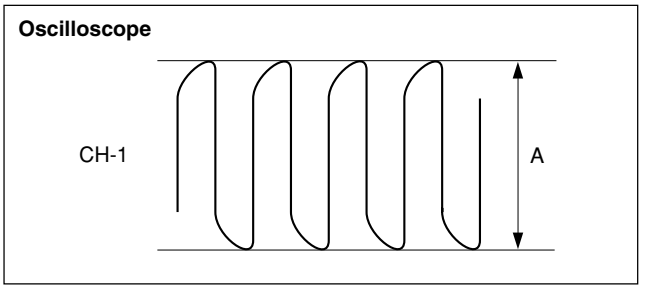
IF-808/826 Board (Side B)

7-3-4. Time Code System Check

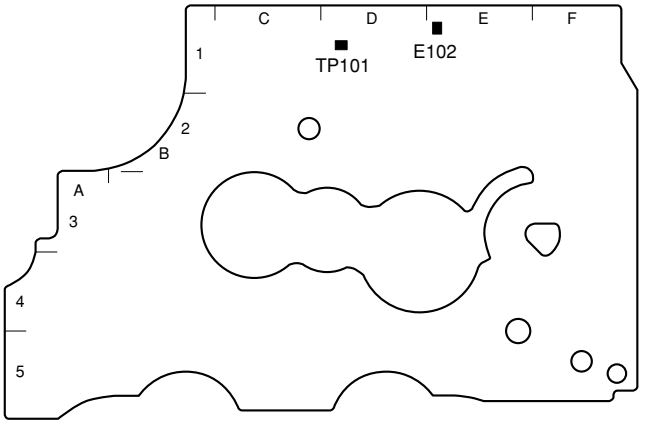
LTC PB Level Check

Equipment : Oscilloscope

1. Connect and set the oscilloscope as follows.
   CH-1 : TP101/DR-432 (D-1), DC 100 mV/DIV
   GND : E102/DR-432 (E-1)
   TIME : 100 µs/DIV
2. Insert the alignment tape.
   525 system : SR5-1
   625 system : SR5-1P
3. Play back the alignment tape and check the waveform level in the following playback modes.
   Playback modes : PLAY
   REW
   SHUTTLE (−5 times normal speed)
   SHUTTLE (−0.21 times normal speed)
   Specification : A ≧ 0.8 V p-p



4. Eject the alignment tape.



DR-432 board (Side A)

Section 8
Electrical Alignment

8-1. General Information on Electrical Alignment

8-1-1. Notes on Electrical Alignment

- Perform adjustment of each block in order of description unless otherwise instructed.
- DO NOT touch inadvertently adjusting components.
- DO NOT execute or change data for adjusting items in the maintenance mode.
  If inadvertently executed or data is changed, turn off the power or execute “ALL DATA PREVIOUS” in the NV-RAM CONTROL menu. Never save data.
  Notes
  In all systems other than the RF system, “ALL DATA PREVIOUS” is not provided.
  If inadvertently executed, turn off the power.
- For details on the maintenance mode, refer to Section 3.
- Before starting adjustments, recommended to make a copy of the setting checking sheet in Appendix A and take a note of settings on the copied setting check sheet. This is easier to set the customer settings after performing adjustments.

8-1-2. Outline of Electrical Alignment

In this Section 8, all of electrical adjustments are described.

Block	Section	Contents	Board to be adjusted
Power Unit	8-2	Output voltage check of the power unit	
Servo	8-3	Servo block adjustment	DR-432
RF	8-4	RF block adjustment	MB-919
Audio	8-5	Analog Betacam LAU adjustment	IF808/826
Video	8-6	Video reference signal adjustment and Video output check	MB-919, IF808/826
SDI	8-7	SDI output encoder free-run frequency adjustment	IF-826
Analog Betacam Video	8-8	Analog Betacam video playback system adjustment	DM-124
Tele-File	8-9	Tele-File system adjustment	CCM-48

8-2. Output Voltage Check of Power Unit

Note

When replacing the power unit, confirm the output voltage before installing it.

Equipment

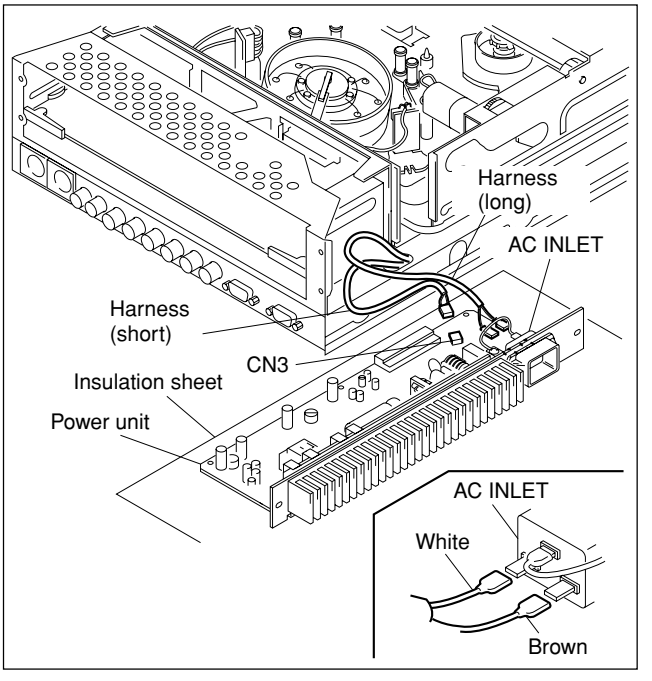
Digital volt-meter : ADVANTEST TR6845 or equivalent

Preparation

1. Turn off the power switch.
2. Disconnect the power cord.
3. Remove the top plate assembly.
   (Refer to Section 1-4-1.)
4. Place the power unit at the side of the unit as shown in a figure.
   Note
   To prevent the short-circuit, place the insulation sheet under the power unit.

5. Connect the harness (short) leading from the power switch to the connector CN3.
   Note
   2 pieces of harness are leading from the power switch.

6. Connect the other harness (long) leading from the power switch to the AC INLET of the power unit.

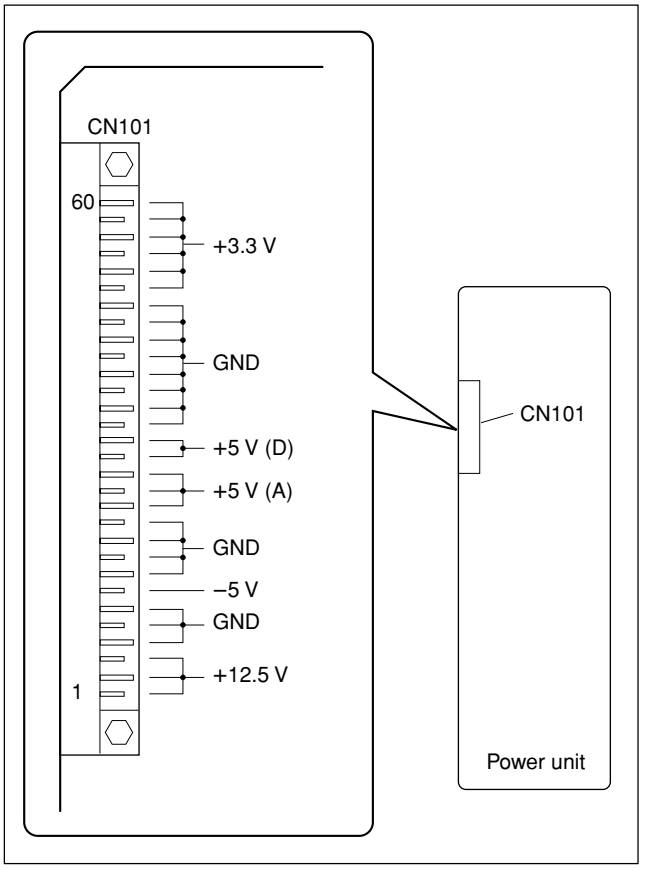


7. Connect the power cord.
8. Turn on the power switch. Allow 10 minutes warm-up.

Output Voltage Check

Measure voltage at pins of CN101 of the power unit.

Pin No. of CN101	Output voltage (Signal)	Specification
1 to 6	+12.5 V	+12.5 ±0.5 V
7 to 12	GND	–
13 to 14	–5 V	–5.2 ±0.2 V
15 to 22	GND	–
23 to 28	+5 V (A)	+5.1 ±0.2 V
29 to 32	+5 V (D)	+5.1 ±0.2 V
33 to 48	GND	–
49 to 60	+3.3 V	+3.2 ±0.2 V



In case of out-of-specification

If not met the specification, replace the power unit.

8-3. Servo Block Adjustment

8-3-1. Outline of Adjustment

When the DR-432 board or the NV-RAM (IC301) on the DR-432 board is replaced, perform surely the servo block adjustment (8-3-2, 8-3-3).
Perform all of servo block adjustments in the adjusting menu of the maintenance mode.

Notes

- In the J series servo block adjustment, perform the adjustment and the data save in either 525 system or 625 system. It is not necessary to perform the adjustment in both systems.
- For details on each menu of the maintenance mode, refer to Section 3.
  In this section, the countermeasures against the malfunction of an automatic adjustment (a message "ADJUST INCOMPLETE" will be displayed on the video monitor) had been described.

Equipment/Fixtures

To perform the servo block adjustment, the following and fixtures equipment are needed.

Analog composite video monitor **Note** The analog composite video monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.				
Alignment tape	525 system	SR5-1	(Part No. 8-960-075-01)	J-1
		MR5-1	(Part No. 8-960-077-01)	J-2
		ZR5-1	(Part No. 8-960-073-01)	J-3
	625 system	SR5-1P	(Part No. 8-960-075-51)	J-1
		MR5-1P	(Part No. 8-960-077-51)	J-2
		ZR5-1P	(Part No. 8-960-073-51)	J-3

Adjustment Items

Section	Item		Adjusting location	Remarks
8-3-2	Servo continuous automatic adjustment		A00 : A01-A09 ADJ	S reel FG duty adjustment (A01) T reel FG duty adjustment (A02) Capstan FG duty adjustment (A03) S reel offset/friction adjustment (A04) T reel offset/friction adjustment (A05) S reel torque adjustment (A06) T reel torque adjustment (A07) Capstan QPL gain adjustment (A08) T reel QPL gain adjustment (A09)
		Data save	A0F : NV-RAM CONTROL	
8-3-3	RF switching position adjustment		A0A : RF SWITCHING POS.	
		Data save	A0F : NV-RAM CONTROL	

8-3-2. Servo Continuous Automatic Adjustment

Note

The alignment tape is not needed.

1. Start up the maintenance mode.
2. Enter A00:A01-A09 ADJ.
   Maintenance Mode → M1 : ADJUST →
   A0 : SERVO ADJUST → A00 : A01-A09 ADJ.
3. Press the SET button.
   The continuous automatic adjusted starts.
   - The execution time is about 2 to 3 minutes.
   - When the automatic adjustment finishes properly, "Auto Adjust Complete" appears on the video monitor.

4. Press the MENU (SHIFT + SET) button to exit A00 : A01-A09 ADJ.

Data save (save of adjustment data)

5. Enter A0F : NV-RAM CONTROL and execute "SAVE SERVO ADJUST DATA".
   - When the data save properly finishes, "Save Complete" appears on the video monitor.

6. Terminate the maintenance mode.

8-3-3. RF Switching Position Adjustment

The following alignment tape is needed.
J-1 : SR5-1 (525 system) or SR5-1P (625 system)
J-2 : MR5-1 (525 system) or MR5-1P (626 system)
J-3 : ZR5-1 (525 system) or ZR5-1P (625 system)

1. Insert the alignment tape and rewind until the time code 00 : 00 : 00 : 00.
2. Start up the maintenance mode.
3. Enter A0A : RF SWITCHING POS.
   Maintenance Mode → M1 : ADJUST →
   A0 : SERVO ADJUST → A0A : RF SWITCHING POS.
   - The alignment tape is ejected automatically.

4. Insert the alignment tape again.
   - The automatic adjustment starts.
   - When the automatic adjustment finishes properly, " Adjust Complete" appears on the video monitor.

5. Press the SET button.
6. Press the MENU (SHIFT + SET) button to exit A0A : RF SWITCHING POS.

Data save (save of adjusted data)

7. Enter A0F : NV-RAM CONTROL, and execute "SAVE SERVO ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

8. Terminate the maintenance mode.
9. Eject the alignment tape.

8-4. RF Block Adjustment

8-4-1. Outline of Adjustment

Perform the RF block adjustment on all of playable digital formats. To perform the automatic adjustment, use the menu in the maintenance mode.

Notes

- Perform the RF block adjustment system of the digital format in the mainly used video system (either 525 or 625 system). If the video system is not appropriate, change the system using the in the setup menu ITEM-013 : 525/625 SYSTEM SELECT. (Refer to the “Basic Menu” in the Operation Manual.)
- For details on each menu of the maintenance mode, refer to Section 3.
  In this section, the countermeasures against the malfunction of an automatic adjustment (a message “Auto Adjust Incomplete” or “Condition NG” will be displayed on the video monitor) had been described.

Equipment/Fixtures

To perform the RF block adjustment the following equipment (or equivalent) and fixtures are needed.

Oscilloscope		TEKTRONIX TDS460A		
Analog composite video monitor				
Note The analog composite video monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.				
Alignment tape(s)	525 system	ZR5-1	(Part No. 8-960-073-01)	J-3
		MR5-1	(Part No. 8-960-077-01)	J-2, J-3
		SR5-1	(Part No. 8-960-075-01)	J-1, J-2, J-3
	625 system	ZR5-1P	(Part No. 8-960-073-51)	J-3
		MR5-1P	(Part No. 8-960-077-51)	J-2, J-3
		SR5-1P	(Part No. 8-960-075-51)	J-1, J-2, J-3

Adjustment Items

Note

The adjustment item differs in model. Referring to the table below, perform adjustments necessary for format.

Section	model	Item	Adjusting location	Remarks
8-4-3	J-1, J-2, J-3	All adjustments of Betacam SX format RF system	A107 : A101-A106 ALL ADJUST	
		Data save	A1F : NV-RAM CONTROL	
8-4-4	J-2, J-3	All adjustments of MPEG IMX format RF system	A117 : A111-A116 ALL ADJUST	
		Data save	A1F : NV-RAM CONTROL	
8-4-5	J-3	All adjustments of Digital Betacam format RF system	A127 : A121-A126 ALL ADJUST	
		Data save	A1F : NV-RAM CONTROL	

8-4-2. Preparation

1. Video heads cleaning

(Refer to Section 4-2-3.)

Note

Perform the cleaning under the power off.

2. Warming-up

Before starting the adjustment, warm up the unit through the power for 20 minutes or more.

Caution at Automatic Adjustment

- While the automatic adjustments are being done, do not touch the JOG dial, SHUTTLE ring, or buttons which may affect the tape travelling.
  If the tape travelling changes, the adjustment can not be done properly or may stop showing “Incomplete” or “NG”.
- When the automatic adjustment is not properly finished (“Auto Adjust Incomplete” or “”Condition NG” appears on the video monitor.), take the action referring to Section 3-3-3, “Condition NG/Automatic Adjustment Fails”.

8-4-3. Betacam SX Format RF Adjustment

1. Insert the following alignment tape. Cue up the tape at the time code 00:08:00:00.
   525 system : SR5-1
   625 system : SR5-1P

2. Start up the maintenance mode.
3. Enter A107 : A101-A106 ALL ADJUST.
   Maintenance Mode → M1 : ADJUST → A1 : RF → A10 : SX RF ADJUST → A107 : A101-A106 ALL ADJUST.
   - “Auto Adjust (Push SET)” appears on the video monitor.
4. Press the SET button to start the automatic adjustment.
   - The automatic adjustment finishes in 5 to 6 minutes and “Auto Adjust Complete” appears at the completion.
5. Press the MENU (SHIFT + SET) button to exit A107 : A101-A106 ALL ADJUST.

Data save (save of adjusted data)

Note

If any anomaly occurs in the automatic adjustment, Do not save the data.

6. Enter A1F : NV-RAM CONTROL, and execute “SAVE ALL ADJUST DATA”.
   - When the data save finishes properly, “Save Complete” appears on the video monitor.

   Note

   When returning to the state before adjustment without saving the adjusted data, execute “ALL DATA PREVIOUS”.

7. Terminate the maintenance mode.
8. Eject the alignment tape.

8-4-4. MPEG IMX Format RF Adjustment (J-2/J-3 only)

Note

Perform this adjustment on a unit (J-2 or J-3) which has the playback function of the MPEG IMX format.

1. Insert the following alignment tape. Cue up the tape at the time code 00:08:00:00.
   525 system : MR5-1
   625 system : MR5-1P

2. Start up the maintenance mode.
3. Enter A117 : A111-A116 ALL ADJUST.
   Maintenance Mode → M1 : ADJUST → A1 : RF → A11 : IMX RF ADJUST → A117 : A111-A116 ALL ADJUST.
   • "Auto Adjust (Push SET)" appears on the video monitor.
4. Press the SET button to start the automatic adjustment.
   • The automatic adjustment finishes in about 5 to 6 minutes and "Auto Adjust Complete" appears at the completion.

5. Press the MENU (SHIFT + SET) button to exit A117 : A111-A116 ALL ADJUST.

Data save (save of adjusted data)

Note

If any anomaly occurs in the automatic adjustment, Do not save the data.

6. Enter A1F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.
   Note
   When returning to the state before adjustment without saving the adjustment data, execute "ALL DATA PREVIOUS".

7. Terminate the maintenance mode.
8. Eject the alignment tape.

8-4-5. Digital Betacam Format RF Adjustment (J-3 only)

Note

Perform this adjustment on a unit (J-3) which has the playback function of the digital betacam format.

1. Insert the following alignment tape. Cue up the tape at the time code 00:08:00:00.
   525 system : ZR5-1
   625 system : ZR5-1P

2. Start up the maintenance mode.
3. Enter A127 : A121-A126 ALL ADJUST.
   Maintenance Mode → M1 : ADJUST → A1 : RF → A12 : DB RF ADJUST → A127 : A121-A126 ALL ADJUST.
   • "Auto Adjust (Push SET)" appears on the video monitor.
4. Press the SET button to start the automatic adjustment.
   • The automatic adjustment finishes in about 5 to 6 minutes and "Auto Adjust Complete" appears at the completion.

5. Press the MENU (SHIFT + SET) button to exit A127 : A121-A126 ALL ADJUST.

Data save (save of adjusted data)

Note

If any anomaly occurs in the automatic adjustment, Do not save the data.

6. Enter A1F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.
   Note
   When returning to the state before adjustment without saving the adjusted data, execute "ALL DATA PREVIOUS".

7. Terminate the maintenance mode.
8. Eject the alignment tape.

8-5. Audio Block Adjustment (IF-808/826 Board)

8-5-1. Outline of Adjustment

Perform the LAU (Analog Betacam) system adjustment in the audio system of the unit.

Equipment/Fixtures

To perform the audio adjustment the following equipment (or equivalent) and fixtures are needed.

Audio analyzer		AUDIO PRECISION System One (or System Two) or TEKTRONIX AA501A Option 02	
Audio level meter		HEWLETT-PACKARD HP3400A	
Analog composite monitor video monitor **Note** The analog composite video monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.			
Extension board		EX-811	(Part No. A-8328-372-A)
Alignment tape(s)	525 system	CR8-1A	(Part No. 8-960-097-45)
	625 system	CR8-1A PS CR8-1A PS	(Part No. 8-960-098-45) (Part No. 8-960-096-45)

Adjustment Items

Section	Item		Adjusting location	Measuring location
8-5-3	LAU Dolby level pre-adjustment	CH1	⊘RV207	TP201
		CH2	⊘RV208	TP202
8-5-4	LAU PB level pre-adjustment	CH2	⊘RV210	MONITOR OUTPUT R
		CH1	⊘RV209	MONITOR OUTPUT L
8-5-5	LAU PB frequency response adjustment (OXIDE)	CH1	⊘RV203, ⊘RV202, S202	MONITOR OUTPUT L
		CH2	⊘RV204, ⊘RV201, S201	MONITOR OUTPUT R
8-5-6	LAU PB frequency response adjustment (METAL)	CH1	⊘RV205	MONITOR OUTPUT L
		CH2	⊘RV206	MONITOR OUTPUT R
8-5-7	LAU Dolby level adjustment	CH1	⊘RV207	TP201
		CH2	⊘RV208	TP202
8-5-8	LAU PB level adjustment	CH2	⊘RV210	MONITOR OUTPUT R
		CH1	⊘RV209	MONITOR OUTPUT L

8-5-2. Preparation

Before performing the adjustment, set switch on the board, control panel, and menus.
After finishing the adjustment, set them back to the customer's settings.

1. AT head cleaning

Clean the tape-run surface of the AT head.
(Refer to Section 4-2-5.)

Note

Perform the cleaning, under the power off.

2. The IF-808/826 board extension

(Refer to Section 1-17.)

3. Switch setting on the board

Set the switch on the IF-808/826 board to the factory setting.

Note

Whenever removing the board or setting the switch, turn off the power.

Board	Ref. No.(Address)	Item	Customer's setting		Factory setting
IF-808/826	S101(C-2)	Analog audio output level	_____	⇨	+4 dBm

4. Video system check

When performing the adjustment on J series units, do it in the mainly used video system.
If the video system is not appropriate, change the video system in the setup menu ITEM-013: 525/625 SYSTEM SELECT. (Refer to the "Basic menu" in the Operation Manual.)

Note

When a unit is used in both 525 and 625 systems, perform the adjustment in the 625 video system.

5. Other setting

Location	Setting item		Customer's setting		Setting at adjustment
Control panel	Monitor signal (AU MON SEL)	L	_____	⇨	CH1
		R	_____	⇨	CH2
	DOLBY C NR (SHIFT + AU MON SEL)		_____	⇨	NR OFF (light off)
Maintenance menu	M37 : METER HEAD ROOM		_____	⇨	20 dB
Setup menu (Item-F series)	F01 : AUDIO NR IN SP MODE		_____	⇨	PANEL

6. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

8-5-3. LAU Dolby Level Pre-Adjustment

CH1 adjustment

1. Connect the audio level meter to TP201 (A-2).
   GND : E201 (A-1)
2. Play back the portion 1 kHz, 0 VU (0 : 00 to 2 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1A PS

3. Check the level on the audio level meter and perform the adjustment.
   Adjusting location : ⊘RV207 (A-1)
   Specification : −10.0 ±0.5 dBu
   (0 dBu ≒ 0.775 V rms)

CH2 adjustment

4. Connect the audio level meter to TP202 (A-1).
   GND : E201 (A-1)
5. Play back the portion (1 kHz, 0 VU (0 : 00 to 2 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1A PS

6. Check the level on the audio level meter and perform the adjustment.
   Adjusting location : ⊘RV208 (B-2)
   Specification : −10.0 ±0.5 dBu
   (0 dBu ≒ 0.775 V rms)

8-5-4. LAU PB Level Pre-Adjustment

1. Set the audio analyzer as follows.
   Measuring mode : LEVEL dBm (600 Ω)
   Input filter : 80 kHz LPF

CH2 adjustment

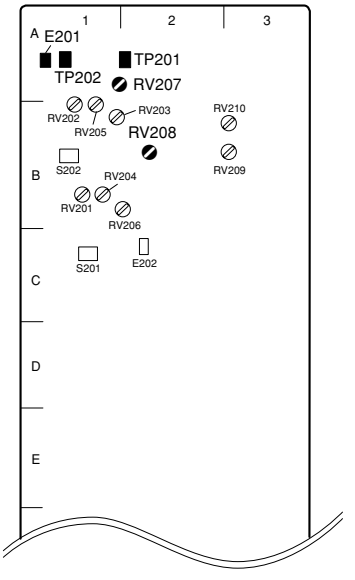
2. Connect the input of the audio analyzer to the MONITOR OUTPUT R connector.
3. Play back the portion 1 kHz, 0 VU (0 : 00 to 2 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1A PS

4. Check the level on the audio level meter and perform the adjustment.
   Adjusting location : ⊘RV210 (B-3)
   Specification : +4.0 ±0.5 dBm
   (with 600 Ω loaded.)

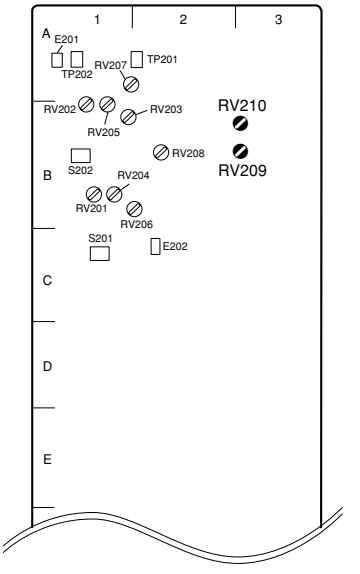
CH1 adjustment

5. Connect the input of the audio analyzer to the MONITOR OUTPUT L connector.
6. Play back the portion (1 kHz, 0 VU (0 : 00 to 2 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1A PS

7. Check the level on the audio level meter and perform the adjustment.
   Adjusting location : ⊘RV209 (B-3)
   Specification : +4.0 ±0.5 dBm
   (with 600 Ω loaded.)



IF-808/826 Board (Side B)



IF-808/826 Board (Side B)

8-5-5. LAU PB Frequency Response Adjustment (OXIDE)

1. Set the audio analyzer as follows.
   Measuring mode : dB RATIO
   Input filter : 80 kHz LPF

CH1 adjustment

2. Connect the input of the audio analyzer to the MONITOR OUTPUT R connector.
3. While playing back the portion specified below (−20 VU) of the alignment tape, perform the checks and adjustments.
   525 system : CR8-1A
   625 system : CR8-1A PS

   Note

   When adjusting RV202, if not met the specification, change the S202 (B-1) setting and readjust.

CH2 adjustment

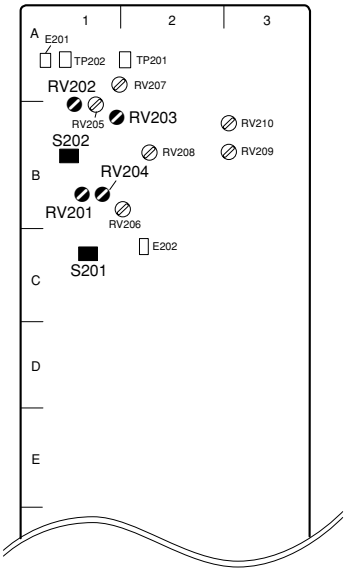
4. Connect the input of the audio analyzer to the MONITOR OUTPUT R connector.
5. While playing back the portion specified below (−20 VU) of the alignment tape, perform the checks and adjustments.
   525 system : CR8-1A
   625 system : CR8-1A PS

   Note

   When adjusting RV201, if not met the specification, change the S201 (C-1) setting and readjust.

Play back portion	Specification [dB]		CH1 adjusting location	CH2 adjusting location
	525 system	625 system		
5:00 to 5:55 (1 kHz)	The measured value is standardized as a reference (0 dB).	The measured value is standardized as a reference (0 dB).	–	–
6:00 to 6:25 (40 Hz)	Correction value ±3.0	Correction value ±3.0	Check only	Check only
6:30 to 6:55 (7 kHz)	Correction value ±0.3	Correction value ±0.4	⊘RV203 (B-1)	⊘RV204 (B-1)
7:00 to 7:25 (10 kHz)	Correction value ±0.3	Correction value ±0.4	Check only	Check only
7:30 to 7:55 (15 kHz)	Correction value $^{+0.3}_{-1.0}$	Correction value ±0.5	⊘RV202 (B-1)	⊘RV201 (B-1)

The correction values are described on the label affixed on the alignment tape cassette.



IF-808/826 Board (Side B)

8-5-6. LAU PB Frequency Response Adjustment (METAL)

Note

In case of 625 video system, perform the following adjustment. In case of 525 video system, set ⊘RV205 (B-1) and ⊘RV206 (B-1) in the mechanical center.

1. Set the audio analyzer as follows.
   Measuring mode : dB RATIO
   Input filter : 80 kHz LPF

CH1 adjustment

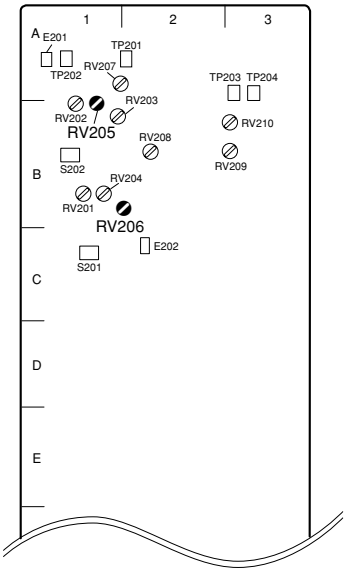
2. Connect the input of the audio analyzer to the MONITOR OUTPUT L connector.
3. While playing back the portion specified below (−20 VU) of the alignment tape CR8-1B PS, perform the checks and adjustment.

CH2 adjustment

4. Connect the input of the audio analyzer to the MONITOR OUTPUT R connector
5. While playing back the portion specified below (−20 VU) of the alignment tape CR8-1B PS, perform the checks and adjustment.

Play back portion	Specification [dB]	CH1 adjusting location	CH2 adjusting location
5:00 to 5:55 (1 kHz)	The measured value is standardized as a reference (0 dB).	–	–
6:00 to 6:25 (40 Hz)	Correction value ±3.0	Check only	Check only
6:30 to 6:55 (7 kHz)	Correction value ±0.3	Check only	Check only
7:00 to 7:25 (10 kHz)	Correction value ±0.4	Check only	Check only
7:30 to 7:55 (15 kHz)	Correction value ±0.5	⊘RV205 (B-1)	⊘RV206 (B-1)

The correction values are described on the label affixed on the alignment tape cassette.



IF-808/826 Board (Side B)

8-5-7. LAU Dolby Level Adjustment

CH1 adjustment

1. Connect the audio level meter to TP201 (A-2).
   GND : E201 (A-1)
2. Play back the portion 1 kHz, 0 VU (0 : 00 to 2 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1B PS

3. Check the level on the audio level meter and perform the adjustment.
   Adjusting location : ⊘RV207 (A-1)
   Specification : −10.0 ±0.1 dBu
   (0 dBu ≒ 0.0775 V rms)

CH2 adjustment

4. Connect the audio level meter to TP202 (A-2).
   GND : E201 (A-1)
5. Play back the portion 1 kHz, 0 VU (0 : 00 to 2 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1B PS

6. Check the level on the audio level meter and perform the adjustment.
   Adjusting location : ⊘RV208 (B-2)
   Specification : −10.0 ±0.1 dBu
   (0 dBu ≒ 0.0775 V rms)

8-5-8. LAU PB Level Adjustment

1. Set the audio analyzer as follows.
   Measuring mode: LEVEL, dBm (600 Ω)
   Input filter : 80 kHz LPF

CH2 adjustment

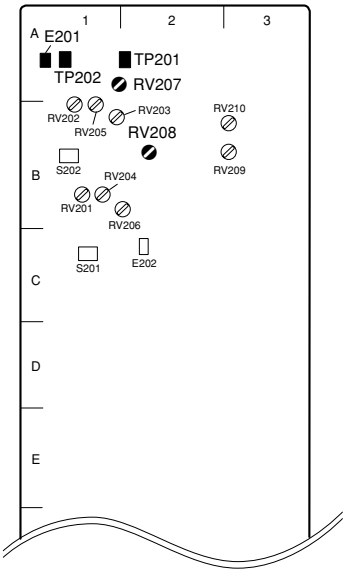
2. Connect the input of the audio analyzer to the MONITOR OUTPUT R connector.
3. Play back the portion 1 kHz, 0 VU (0 : 00 to 2 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1B PS

4. Check the level on the audio level meter and perform the adjustment.
   Adjusting location : ⊘RV210 (B-3)
   Specification : +4.0 ±0.2 dBm
   (with 600 Ω loaded.)

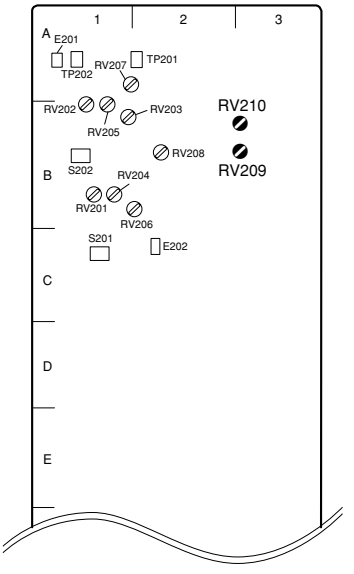
CH1 adjustment

5. Connect the input of the audio analyzer to the MONITOR OUTPUT L connector.
6. Play back the portion 1 kHz, 0 VU (0 : 00 to 2 : 55) of the alignment tape.
   525 system : CR8-1A
   625 system : CR8-1B PS

7. Check the level on the audio level meter and perform the adjustment.
   Adjusting location : ⊘RV209 (B-3)
   Specification : +4.0 ±0.2 dBm
   (with 600 Ω loaded.)



IF-808/826 Board (Side B)



IF-808/826 Board (Side B)

8-6. Video Block Adjustment/Confirmation

8-6-1. Outline of Adjustment

Perform the reference signal adjustment and analog video output check.
When replacing or repairing the IF-808/826 board, “8-6-3. 27 MHz VCO Free-run Adjustment” is not required.

Note

For analog Betacam playback adjustment, refer to Section 8-8.

Equipment/Fixtures

To perform the video block, the following equipment (or equivalent) and fixtures are needed.

Oscilloscope	TEKTRONIX TDS460A
Frequency counter	ADVANTEST TR5821AK
Analog composite waveform monitor	525 system: TEKTRONIX 1750A or 1780R
	625 system: TEKTRONIX 1751A or 1781R
Analog component waveform monitor*1	TEKTRONIX WFM-300A
Analog composite video monitor **Note** The video monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.	
EX-811 extension board	A-8328-372-A
S-BNC video cable	J-6381-380-A
75 Ω terminator (1 piece/3 pieces*1)	

*1 : J-1/901, J-2/901, and J-3/901

Adjustment (Check) Items

Note

When replacing or repairing the IF-808/826 board, “8-6-3. 27 MHz VCO Free-run Frequency Adjustment” is not required.

Section	Item	Adjusting location	Measuring location
8-6-3	27MHz VCO free-run frequency adjustment	A20 : VCO FREQ	
8-6-4	composite video output check	−−−	VIDEO OUTPUT COMPOSITE
8-6-5	S video output level check	−−−	VIDEO OUTPUT S VIDEO
8-6-6	component video output level check (only a unit with BKJ-1)	−−−	VIDEO OUTPUT COMPONENT

8-6-2. Preparation

Before performing the video output check, set the setup menu and the setup extended menu.
After setting, set back to the customer's settings.

1. Video system check

Perform the adjustment on J series units in the mainly used video system (525 or 625 system).
If the video system is not appropriate, change the video system in the setup menu ITEM-013 : 525/625 SYSTEM SELECT. (See "Basic Menu" in the Operation Manual.)

2. Setup extended menu settings

1. Turn on the unit.
2. Change the setup menu ITEM-099 : MENU GRADE to ENHAN to operate the setup extended menu.
3. Set the following items in the setup extended menu as shown below.

ITEM	Customer's setting		Factory-setting
710 : INTERNAL VIDEO SIGNAL GENERATOR	_____	⇨	CB75∗2
713 : VIDEO SETUP REFERENCE LEVEL∗1	_____	⇨	0.0 %
715 : VIDEO GAIN CONTROL	_____	⇨	20H
716 : CHROMA GAIN CONTROL	_____	⇨	20H
717 : CHROMA PHASE CONTROL	_____	⇨	80H
718 : SETUP LEVEL	_____	⇨	3F
721 : Y/C DELAY	_____	⇨	800H

∗1 : Only 525 system
∗2 : The built-in signal is not outputted when a cassette is inserted.

3. Warming-up

Warm up the unit and equipment through the power 30 minutes or more.

8-6-3. 27 MHz VCO Free-run Frequency Adjustment

When replacing or repairing the IF-808/826 board, this adjustment is not required.

Equipment/Fixtures

- Oscilloscope
- Frequency counter
- Analog composite video monitor

  Note

  The video monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector.
- Extension board, EX-811

Preparation

1. Extend the IF-808 board (or IF-826 board) with the EX-811 extension board.
   (For procedure, refer to Section 1-17.)
2. Feed no signal to the EXT.SYNC connector.
   (Leave the EXT.SYNC connector disconnected.)
3. Set the oscilloscope as follows.
   CH-2 : DC 2 V/DIV
   TIME : 100 µs/DIV
4. Connect CH-2 output of the oscilloscope to the input of the frequency counter.
5. Connect CH-2 input of the oscilloscope to pin 42 on the EX-811 extension board.
   GND : D-GND/EX-811 extension board
6. Start up the maintenance mode.
7. Enter A20 : VCO FREQ.
   Maintenance Mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A20 : VCO FREQ.

Adjustment

8. Adjust the free-run frequency of the 27 MHz VCO.
   Adjusting location : A20 : VCO FREQ
   Specification 525 system : 27,000,000 ±1 Hz
   625 system : 27,000,000 ±1 Hz

Data save (save of adjusted data)

9. "Push SET button" appears. Then, press the SET button.
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

   Note

   When loading the previous data (before adjustment) without saving the adjusted data, turn off the unit.

10. Terminate the maintenance mode.

8-6-4. Composite Video Output Check

Equipment/Fixtures

- Analog composite waveform monitor (or oscilloscope)
- Analog composite video monitor

Note

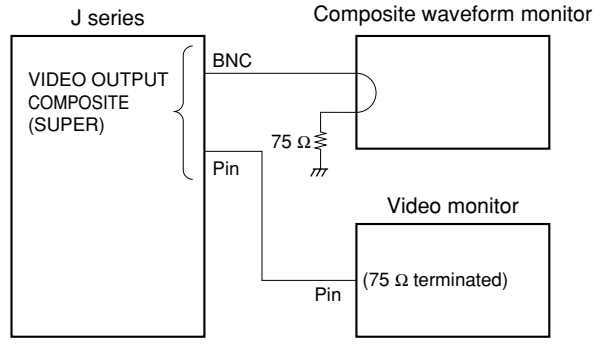
The video monitor is used to display the menu.

- 75 Ω terminator

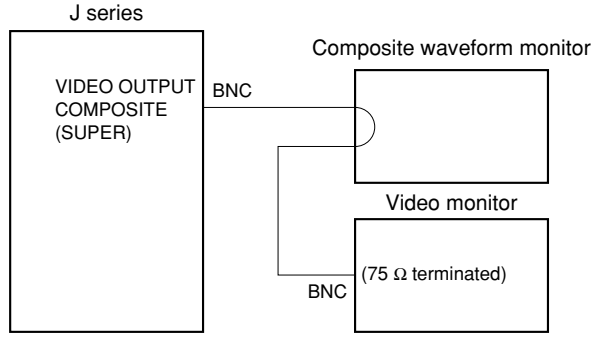
Preparation

1. Perform the video system check and setup extended menu settings in Section 8-6-2.
2. Connect the unit and the equipment as shown below. (Connection 1 or Connection 2)

• Connection 1



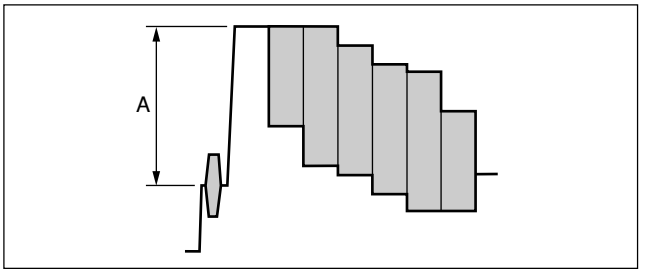
• Connection 2



Confirmation

Confirm that the white peak level A of the signal meets the specification.

Specification: A = 100 ±5 IRE (A = 714 ±35 mV)



8-6-5. S Video Output Level Check

Equipment/Fixtures

- Analog composite waveform monitor (or oscilloscope)
- Analog composite video monitor

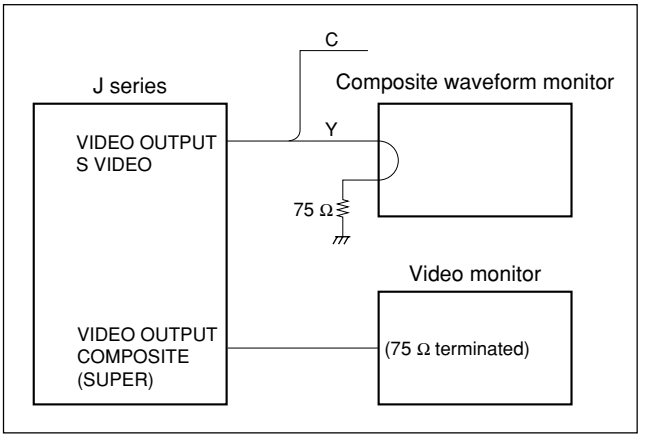
Note

The video monitor is used to display the menu.

- S-BNC video cable
- 75 Ω terminator

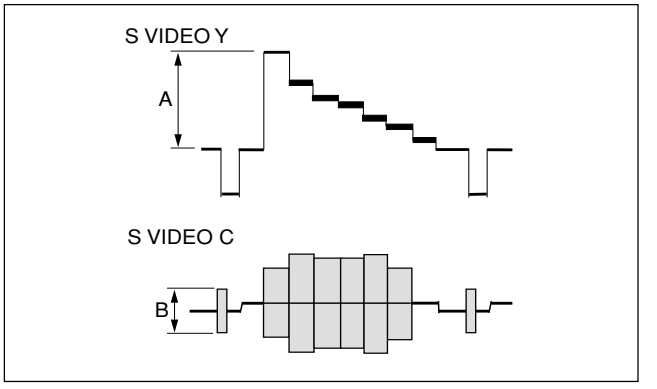
Preparation

1. Perform the video system check and setup extended menu settings in Section 8-6-2.
2. Connect the unit and the equipment as shown below.



Check

1. Check that the level A of Y signal meets the specification.
   Specification 525 system : A = 714 ±35 mV
   625 system : A = 700 ±35 mV
2. Change the connection of the equipment to C signal.
3. Check that the level B (chrominance burst) of C signal meets the specification.
   Specification 525 system : B = 286 ±14 mV
   625 system : B = 300 ±15 mV



8-6-6. Component Video Output Level Check (For J-1/901, J-2/901, and J-3/901)

Equipment/Fixtures

- Analog component waveform monitor
- Analog composite video monitor

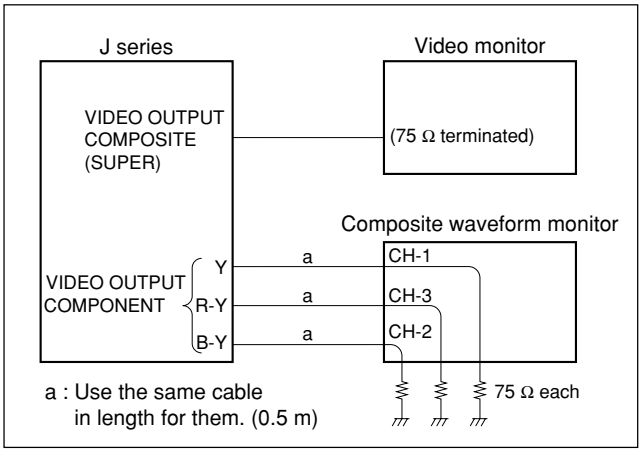
Note

The video monitor is used to display the menu.

- 75 Ω terminator

Preparation

1. Perform the video system check and setup extended menu settings in Section 8-6-2.
2. Connect the unit and the equipment as shown below.

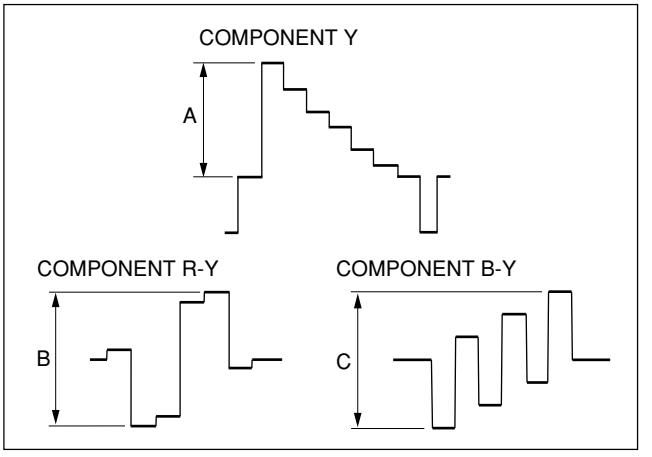


Confirmation

Confirm that levels A, B, and C meet the specification.

Specification :

525 system	625 system
A = 714 ±35 mV	A = 700 ±35 mV
B = 757 ±35 mV	B = 525 ±26 mV
C = 757 ±35 mV	C = 525 ±26 mV



8-7. SDI VCO Adjustment (IF-826 Board) (For J-1/902, J-2/902, and J-3/902)

8-7-1. Outline of Adjustment

To perform the electrical adjustment of the SDI output, adjust the VCO free-run frequency for the encoder.

Equipment/Fixture

The following equipment (or equivalent) and fixtures are needed.

- Oscilloscope : TEKTRONIX TDS460A
- Frequency counter : ADVANTEST TR5821AK
- Extension board : EX-811 (Part No. A-8328-372-A)

8-7-2. VCO Free-run Frequency Adjustment

Preparation

1. Extend the IF-826 board.

(Refer to Section 1-17.)

2. Switch setting check

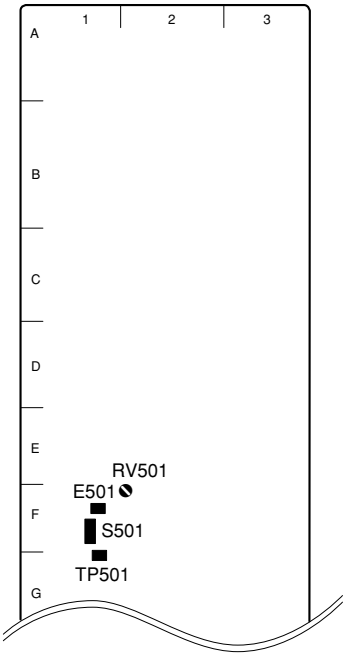
S501/IF-826 (F-2) → Adjusting position
(Refer to Section 1-12-2.)

3. Warming-up

Warm up the unit and equipment through the power for 10 minutes or more.

Adjustment Procedure

1. Set the oscilloscope as follows.
   CH-2 : DC 2 V/DIV
   TIME : 100 µs/DIV
2. Connect the CH-2 output of the oscilloscope to the input of the frequency counter.
3. Connect the CH-2 input of the oscilloscope to TP501/ IF-826 (G-2).
   GND : E501/IF-826 (F-2)
4. Read the frequency counter and adjust.
   Adjusting location : ⊘RV501/IF-826 (F-2)
   Specification : 27.00 ±0.10 MHz



IF-826 Board (Side B)

8-8. Analog Betacam Playback Block Adjustment

8-8-1. Outline of Adjustment

To adjust the video system in the analog Betacam playback system, perform as follows. The adjustment is done on the DM-124 board. The item and order of the adjustment are listed in the “Adjustment Items”.

Notes

- The analog Betacam video playback system is adjusted alternating 525 system and 625 system. Perform the adjustment in the instructed video system.
  To change the video system, use the setup menu ITEM-013 : 525/625 SYSTEM SELECT.
  (Refer to “Basic Menu” in the Operation Manual.)
- To adjust the audio system (LAU) in the analog Betacam playback system, refer to Section 8-5.

Equipment/Fixtures

To perform the electrical adjustment of the analog Betacam video playback system, the following equipment (or equivalent) and fixtures are needed.

Analog composite waveform monitor	525 system :	TEKTRONIX 1750A or 1780R
	625 system :	TEKTRONIX 1751A or 1781R
Analog component waveform monitor		TEKTRONIX WFM-300A
Oscilloscope		TEKTRONIX TDS460A
Spectrum analyzer		ADVANTEST R3261A
Network analyzer		ANRITSU MS-420B
Digital voltmeter		ADVANTEST TR6845
Analog composite video monitor **Note** Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) on the connector panel.		(NTSC/PAL selectable)
Cleaning tape		BCT-HD12CL (merchandise)
Alignment tapes		CR5-1B (Part No. 8-960-096-41)
		CR5-1B PS (Part No. 8-960-096-91)
		CR5-2A (Part No. 8-960-097-44)
		CR5-2A PS (Part No. 8-960-098-44)
75 Ω terminators (5 pieces)		
Shorting clips (2 pieces)		

Adjustment Items

Section	Item				Adjusting location	Remarks
8-8-3	Initial data setting				A3 : ALL BETACAM DM data A4 : ALL BETACAM TBC data	
8-8-4	Cosine equalizer adjustment	625 system	OMC DC offset		A35 : G-BAND/OMC DC VR : OMC DC METAL-Y	Set data to EB.
					A35 : G-BAND/OMC DC VR : OMC DC METAL-C A35 : G-BAND/OMC DC VR : OMC DC OXIDE-Y A35 : G-BAND/OMC DC VR : OMC DC OXIDE-C	Set each data to D6.
			METAL Y	Group delay	⊘RV101/DM-124, ⊘RV102/DM-124	TP105/DM-124
				Main	A31 : COS EQ VR (METAL-Y) : MAIN METAL-Y-A A31 : COS EQ VR (METAL-Y) : MAIN METAL-Y-B	TP107/DM-124
				Sub	A31 : COS EQ VR (METAL-Y) : SUB METAL-Y-A A31 : COS EQ VR (METAL-Y) : SUB METAL-Y-B	Set data to 90.
			METAL C	Group delay	⊘RV301/DM-124, ⊘RV302/DM-124	TP305/DM-124
				Main	A32 : COS EQ VR (METAL-C) : MAIN METAL-C-A A32 : COS EQ VR (METAL-C) : MAIN METAL-C-B	TP307/DM-124
				Sub	A32 : COS EQ VR (METAL-C) : SUB METAL-C-A A32 : COS EQ VR (METAL-C) : SUB METAL-C-B	Set data to 97.
			OXIDE C	Group delay	⊘RV303/DM-124, ⊘RV304/DM-124	TP305/DM-124
				Main	A34 : COS EQ VR (OXIDE-C) : MAIN OXIDE-C-A A34 : COS EQ VR (OXIDE-C) : MAIN OXIDE-C-B	TP307/DM-124
				Sub	A34 : COS EQ VR (OXIDE-C) : SUB OXIDE-C-A A34 : COS EQ VR (OXIDE-C) : SUB OXIDE-C-B	TP306/DM-124
			OXIDE Y	Group delay	⊘RV104/DM-124	TP105/DM-124
				Main	A33 : COS EQ VR (OXIDE-Y) : MAIN OXIDE-Y-A A33 : COS EQ VR (OXIDE-Y) : MAIN OXIDE-Y-B	TP107/DM-124
				Sub	A33 : COS EQ VR (OXIDE-Y) : SUB OXIDE-Y-A A33 : COS EQ VR (OXIDE-Y) : SUB OXIDE-Y-B	TP106/DM-124
			Data save		A3F : NV-RAM CONTROL	
		525 system	METAL Y	Group delay	⊘RV101/DM-124, ⊘RV102/DM-124	TP105/DM-124
				Sub	A31 : COS EQ VR (METAL) : SUB METAL-Y-A A31 : COS EQ VR (METAL) : SUB METAL-Y-B	Set data to 60.
			METAL C	Group delay	⊘RV301/DM-124, ⊘RV302/DM-124	TP305/DM-124
				Sub	A31 : COS EQ VR (METAL) : SUB METAL-C-A A31 : COS EQ VR (METAL) : SUB METAL-C-B	Set data to 5A.
			OXIDE C	Group delay	⊘1RV303/DM-124, ⊘RV304/DM-124	TP305/DM-124
				Sub	A33 : COS EQ VR (OXIDE) : SUB OXIDE-C-A A33 : COS EQ VR (OXIDE) : SUB OXIDE-C-B	TP306/DM-124
			OXIDE Y	Group delay	⊘RV104/DM-124	TP105/DM-124
				Sub	A33 : COS EQ VR (OXIDE) : SUB OXIDE-Y-A A33 : COS EQ VR (OXIDE) : SUB OXIDE-Y-B	TP106/DM-124
			Data save		A3F : NV-RAM CONTROL	
8-8-5	Cosine equalizer provisional adjustment				**Note** Section 8-8-4 discribes the adjustment method when the network analyzer is available. Section 8-8-5 discribes the provisional adjustment method when the network analyzer is not available. Use the provisional adjustment method only in an emergency or when a network analyzer is not available. Be sure to perform the adjustment (Section 8-8-4) using the network analyzer at a later data.	

OMC : Over-modulate Correction Circuit

(Continued)

Section	Item			Adjusting location	Remarks
8-8-6	DM RF output level adjustment		OXIDE Y	⊘RV112/DM-124	TP107/DM-124
			OXIDE C	⊘RV312/DM-124	TP307/DM-124
			METAL C	⊘RV311/DM-124	TP307/DM-124
			METAL Y	⊘RV111/DM-124	TP107/DM-124
8-8-7	OMC carrier balance adjustment (Perform in 625 system.)		METAL Y	A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-A A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-B	TP109/DM-124
			METAL C	A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-A A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-B	TP309/DM-124
			OXIDE C	A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-A A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-B	TP309/DM-124
			OXIDE Y	A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-A A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-B	TP109/DM-124
			Data save	A3F : NV-RAM CONTROL	
8-8-8	OMC carrier balance provisional adjustment (Perform in 625 system.)			**Note** Section 8-8-7 discribes the adjustment method when the network analyzer is available. Section 8-8-8 discribes the provisional adjustment method when the network analyzer is not available. Use the provisional adjustment method only in an emergency or when a network analyzer is not available. Be sure to perform the adjustment (Section 8-8-7) using the network analyzer at a later data.	
8-8-9	Demodulator limiter balance adjustment	625 system	OXIDE Y	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-Y	TP502/DM-124
			METAL Y	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-Y	TP502/DM-124
			METAL C	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-C	TP706/DM-124
			OXIDE C	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-C	TP706/DM-124
			Data Save	A3F : NV-RAM CONTROL	
		525 system	METAL C	A38 : DEMO BAL : DEMO BAL METAL-C	TP706/DM-124
			OXIDE C	A38 : DEMO BAL : DEMO BAL OXIDE-C	TP706/DM-124
			Data save	A3F : NV-RAM CONTROL	
8-8-10	Non-linear output level adjustment		METAL C	⊘RV703/DM-124 (Perform in 625 system.)	TP706/DM-124
			C	⊘RV704/DM-124	TP706/DM-124
			METAL Y	⊘RV503/DM-124	TP506/DM-124
			OXIDE Y	⊘RV504/DM-124	TP506/DM-124
8-8-11	PB frequency response adjustment	625 system	METAL Y	A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-B	VIDEO OUTPUT
			METAL C	A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-B	VIDEO OUTPUT
			OXIDE Y	A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-B	VIDEO OUTPUT
			OXIDE C	A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-B	VIDEO OUTPUT
			Data save	A3F : NV-RAM CONTROL	
		525 system	METAL Y	A31 : COS EQ VR (METAL) : EQ1 METAL-Y-A A31 : COS EQ VR (METAL) : EQ1 METAL-Y-B	VIDEO OUTPUT
			METAL C	A31 : COS EQ VR (METAL) : EQ1 METAL-C-A A31 : COS EQ VR (METAL) : EQ1 METAL-C-B	VIDEO OUTPUT
			OXIDE Y	A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-A A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-B	VIDEO OUTPUT
			OXIDE C	A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-A A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-B	VIDEO OUTPUT
			Data save	A3F : NV-RAM CONTROL	

(Continued)

Section	Item			Adjusting location	Remarks
8-8-12	Drop-out compensation equalizer adjustment		METAL Y	⊘RV109/DM-124	TP112/DM-124
			METAL C	⊘RV309/DM-124	TP312/DM-124
			OXIDE Y	⊘RV310/DM-124	TP312/DM-124
			OXIDE C	⊘RV110/DM-124	TP112/DM-124
8-8-13	DM RF output level re-adjustment (Perform “8-8-6. DM RF Output Level Adjustment” again.)		METAL Y	⊘RV111/DM-124	TP107/DM-124
			METAL C	⊘RV311/DM-124	TP307/DM-124
			OXIDE C	⊘RV312/DM-124	TP307/DM-124
			OXIDE Y	⊘RV112/DM-124	TP107/DM-124
8-8-14	RF envelope adjustment		Y	⊘RV113/DM-124	TP112/DM-124
			C	⊘RV313/DM-124	TP312/DM-124
	(Perform in 625 system.)		TH A ch level	A36 : DO TH/ENV TH VR : ENV-TH-A	Set data to 20.
			TH B ch level	A36 : DO TH/ENV TH VR : ENV-TH-B	Set data to 20.
			Data save	A3F : NV-RAM CONTROL	
8-8-15	Search picture voltage adjustment (Perform in 625 system.)		Offset	A38 : DEMO BAL/ETC. VR : SV TAPE SPD OFFSET	TP508/DM-124
			Y	A38 : DEMO BAL/ETC. VR : VAR DEEMP-Y	TP503/DM-124
			C	A38 : DEMO BAL/ETC. VR : VAR DEEMP-C	TP703/DM-124
			Data save	A3F : NV-RAM CONTROL	
8-8-16	Search picture gain adjustment		Data save	⊘RV506/DM-124	TP506/DM-124
8-8-17	Component output level adjustment	625 system	METAL Y	A41 : LVL/PHASE VR : AD LEVEL METAL-Y	VIDEO OUTPUT
			METAL C	A41 : LVL/PHASE VR : AD LEVEL METAL-C	VIDEO OUTPUT
			OXIDE Y	A41 : LVL/PHASE VR : AD LEVEL OXIDE-Y	VIDEO OUTPUT
			OXIDE C	A41 : LVL/PHASE VR : AD LEVEL OXIDE-C	VIDEO OUTPUT
			Data save	A4F : NV-RAM CONTROL	
		525 system	METAL Y	A41 : LVL/PHASE VR : AD LEVEL METAL-Y	VIDEO OUTPUT
			METAL C	A41 : LVL/PHASE VR : AD LEVEL METAL-C	VIDEO OUTPUT
			OXIDE Y	A41 : LVL/PHASE VR : AD LEVEL OXIDE-Y	VIDEO OUTPUT
			OXIDE C	A41 : LVL/PHASE VR : AD LEVEL OXIDE-C	VIDEO OUTPUT
			Data save	A4F : NV-RAM CONTROL	
8-8-18	VCO lock range adjustment		Y	⊘LV1401/DM-124	TP1401/DM-124
			C	⊘LV1601/DM-124	TP1601/DM-124
8-8-19	TBC VCO free-run adjustment		Y	⊘RV1301/DM-124	Video monitor
			C	⊘RV1501/DM-124	Video monitor
8-8-20	FAST VCO tracking adjustment (Perform in 625 system.)		Offset	A42 : YC DL/Y TR VR : Y TR OFFSET	Video monitor
			Data save	A4F : NV-RAM CONTROL	

(Continued)

Section	Item			Adjusting location	Remarks
8-8-21	Playback video phase adjustment	625 system		A41 : LVL/PHASE VR : VIDEO PH A40 : TBC IC DATA : SQ-Y RZ*1	VIDEO OUTPUT
			Data save	A4F : NV-RAM CONTROL	
		525 system		A41 : LVL/PHASE VR : VIDEO PH A40 : TBC IC DATA : SQ-Y RZ*1	VIDEO OUTPUT
			Data save	A4F : NV-RAM CONTROL	
8-8-22	TBC Y/C delay adjustment	625 system	METAL	A42 : YC DL/Y TR VR : Y/C DELAY M-A A42 : YC DL/Y TR VR : Y/C DELAY M-B ⊘RV1501/DM-124 A40 : TBC IC DATA : SQ-C RZ*2	VIDEO OUTPUT
			OXIDE	A42 : YC DL/Y TR VR : Y/C DELAY O-A A42 : YC DL/Y TR VR : Y/C DELAY O-B	VIDEO OUTPUT
			Data save	A4F : NV-RAM CONTROL	
		525 system	METAL	A42 : YC DL VR : Y/C DELAY M-A A42 : YC DL VR : Y/C DELAY M-B ⊘RV1501/DM-124 A40 : TBC IC DATA : SQ-C RZ*3	VIDEO OUTPUT
			OXIDE	A42 : YC DL VR : Y/C DELAY O-A A42 : YC DL VR : Y/C DELAY O-B	VIDEO OUTPUT
			Data save	A4F : NV-RAM CONTROL	

*1 : When cannot be adjusted with “A41 : LVL/PHASE VR : VIDEO PH”, change data of “SQ-Y RZ”.
*2 : When cannot be adjusted with “A42 : YC DL/Y TR VR : Y/C DELAY M-A”, change data of “SQ-C RZ”.
*3 : When cannot be adjusted with “A42 : YC DL VR : Y/C DELAY M-A”, change data of “SQ-C RZ”.

How to Eject a Cassette Tape

In menu A3x or A4x of the maintenance mode, eject a cassette tape in the following manner. (A cassette tape can be ejected in other method. But it is omitted.)

1. When instructed to eject a cassette tape, press the SET button once.
   - The white square mark to indicate the ejection appears at the right side corner of a superimposed picture on the video monitor.
2. Press the EJECT button to eject the cassette tape.
3. Press the MENU (SHIFT + SET) button once.
   - The white square mark on the video monitor disappears.

Note

In the sentence, it is supplemented with (SET → EJECT → MENU).

8-8-2. Preparation

Before starting the adjustment, set the switches on the board, the setup menu, and the setup extended menu.
After finishing the adjustment, set them back to the customer's settings.

1. Removal of bottom plate assembly

Referring to the Section 1-4-2, remove the bottom plate assembly.

2. Setting of switch on the board

Set the switches on the DM-124 board to the factory-setting.

Note

When changing the switch setting, turn off the unit.

Ref. No.	Factory-setting
S1701, S1801	All OFF

3. Setup extended menu settings in 525 system

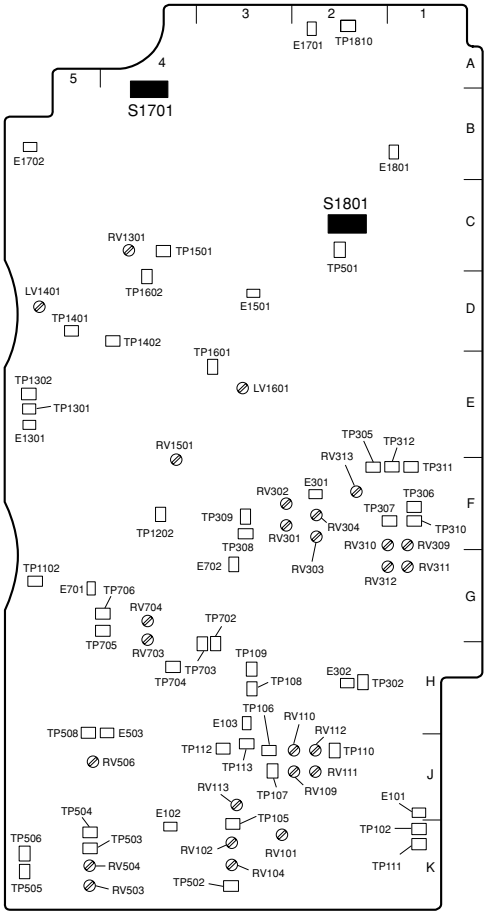
1. Turn on the unit.
2. Check that the unit is used in 525 system.
   If not, change the system to using the setup menu ITEM-013 : 525/625 SYSTEM SELECT.
   (Refer to "Basic Menu" in the Operation Manual.)
3. Set the setup menu ITEM-099 : MENU GRADE to ENHAN to operate the setup extended menu.
4. Set ITEM-713 in the setup extended menu as follows.

ITEM	Customer's setting		Setting at adjustment
713 : VIDEO SETUP REFERENCE LEVEL	_____	⇨	0.0 %

4. Cleaning

Insert the cleaning tape .

- The EJECT button blinks and the PLAY button lights. The cleaning tape is played back for about 5 seconds and ejected automatically.



DM-124 Board (Side A)

8-8-3. Initial Data Setting

Set the initial data of the adjustments in the following cases.

- DM-124 board is replaced.
- NV-RAM (IC1805) on the DM-124 board is replaced.

Equipment

- Analog composite video monitor

Note

This monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.

1. Initial Data Setting of 525 System

1. Change the unit to the 525 system.
2. Start up the maintenance mode.
3. Select A3 : BETACAM DM and A4 : BETACAM TBC in order.
   Maintenance Mode → M1 : ADJUST → A3 :BETACAM DM, A4 : BETACAM TBC
4. Set the initial data to each items of the sub-menu shown in the table.
5. Enter A3F : NV-RAM CONTROL or A4F : NV-RAM CONTROL, and execute “SAVE ALL ADJUST DATA”.
   - When the data save finishes properly, “Save Complete” appears on the video monitor.

   Note

   A3F : NV-RAM CONTROL and A4F : NV-RAM CONTROL menu have the same function.
   Data can be saved in either menus.

6. Terminate the maintenance mode.

525 system initial data value

Sub-menu (A3 : BETACAM DM)	Item	Initial data
A31 : COS EQ VR (METAL)	EQ1 METAL-Y-A	86
	EQ1 METAL-Y-B	86
	SUB METAL-Y-A	60
	SUB METAL-Y-B	60
	EQ1 METAL-C-A	6D
	EQ1 METAL-C-B	6D
	SUB METAL-C-A	5A
	SUB METAL-C-B	5A
A33 : COS EQ VR (OXIDE)	EQ1 OXIDE-Y-A	8A
	EQ1 OXIDE-Y-B	8A
	SUB OXIDE-Y-A	8A
	SUB OXIDE-Y-B	8A
	EQ1 OXIDE-C-A	80
	EQ1 OXIDE-C-B	80
	SUB OXIDE-C-A	71
	SUB OXIDE-C-B	71
A35 : G-BAND VR	GUARD BAND METAL-Y	20
	GUARD BAND METAL-C	26
	GUARD BAND OXIDE-Y	38
	GUARD BAND OXIDE-C	3D
A36 : DO TH VR	DO TH METAL-Y	18
	DO TH METAL-C	1E
	DO TH OXIDE-Y	33
	DO TH OXIDE-C	35
A38 : DEMO BAL VR	DEMO BAL METAL-C	80
	DEMO BAL OXIDE-C	83

Sub-menu (A4 : BETACAM TBC)	Item	Initial data
A40 : TBC IC DATA	SQ-Y RZ	46
	SQ-C RZ	4D
A41 : LVL/PHASE VR	AD LEVEL METAL-Y	AA
	AD LEVEL METAL-C	76
	AD LEVEL OXIDE-Y	A1
	AD LEVEL OXIDE-C	7A
	VIDEO PH	80
A42 : YC DL VR	Y/C DELAY M-A	80
	Y/C DELAY M-B	80
	Y/C DELAY O-A	A0
	Y/C DELAY O-B	A0

2. Initial Data Setting of 625 System

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Select A3 : BETACAM DM and A4 : BETACAM TBC in order.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM DM, A4 : BETACAM TBC
4. Set the initial data to each item of the sub-menu shown in the table.
5. Enter A3F : NV-RAM CONTROL or A4F : NV-RAM CONTROL, and execute "SAVE ALL ADJUSTMENT DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

   Note

   A3F : NV-RAM CONTROL and A4F : NV-RAM CONTROL menus have the same function.
   Data can be saved in the either menus.

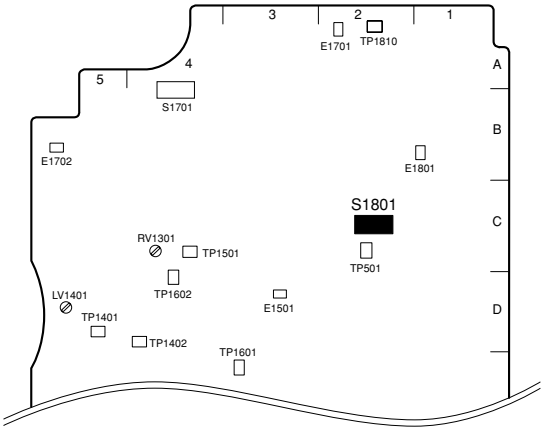
6. Terminate the maintenance mode.

625 system initial data value

Sub-menu (A3 : BETACAM DM)	Item	Initial data
A31 : COS EQ VR (METAL-Y)	EQ1 METAL-Y-A	88
	EQ1 METAL-Y-B	88
	MAIN METAL-Y-A	9F
	MAIN METAL-Y-B	9F
	SUB METAL-Y-A	90
	SUB METAL-Y-B	90
A32 : COS EQ VR (METAL-C)	EQ1 METAL-C-A	75
	EQ1 METAL-C-B	75
	MAIN METAL-C-A	97
	MAIN METAL-C-B	97
	SUB METAL-C-A	97
	SUB METAL-C-B	97
A33 : COS EQ VR (OXIDE-Y)	EQ1 OXIDE-Y-A	89
	EQ1 OXIDE-Y-B	89
	MAIN OXIDE-Y-A	B8
	MAIN OXIDE-Y-B	B8
	SUB OXIDE-Y-A	89
	SUB OXIDE-Y-B	89
A34 : COS EQ VR (OXIDE-C)	EQ1 OXIDE-C-A	90
	EQ1 OXIDE-C-B	90
	MAIN OXIDE-C-A	A7
	MAIN OXIDE-C-B	A7
	SUB OXIDE-C-A	AD
	SUB OXIDE-C-B	AD
A35 : G-BAND/OMC DC VR	GUARD BAND METAL-Y	28
	GUARD BAND METAL-C	2E
	GUARD BAND OXIDE-Y	38
	GUARD BAND OXIDE-C	3B
	OMC DC METAL-Y	EB
	OMC DC METAL-C	D6
	OMC DC OXIDE-Y	D6
	OMC DC OXIDE-C	D6
A36 : DO TH/ENV TH VR	DO TH METAL-Y	20
	DO TH METAL-C	25
	DO TH OXIDE-Y	30
	DO TH OXIDE-C	33
	ENV-TH-A	20
	ENV-TH-B	20

Sub-menu (A3 : BETACAM DM)	Item	Initial data
A37 : OMC LIM BALANCE VR	OMC LIM METAL-Y-A	78
	OMC LIM METAL-Y-B	78
	OMC LIM METAL-C-A	51
	OMC LIM METAL-C-B	51
	OMC LIM OXIDE-Y-A	78
	OMC LIM OXIDE-Y-B	78
	OMC LIM OXIDE-C-A	55
	OMC LIM OXIDE-C-B	55
A38 : DEMO BAL/ETC. VR	DEMO BAL METAL-Y	80
	DEMO BAL METAL-C	80
	DEMO BAL OXIDE-Y	83
	DEMO BAL OXIDE-C	83
	VAR DEEMP-Y	80
	VAR DEEMP-C	3E
	SV TAPE SPD OFFSET	60

Sub-menu (A3 : BETACAM DM)	Item	Initial data
A40 : TBC IC DATA	SQ-Y RZ	45
	SQ-C RZ	40
A41 : LVL/PHASE VR	AD LEVEL METAL-Y	99
	AD LEVEL METAL-C	A0
	AD LEVEL OXIDE-Y	9C
	AD LEVEL OXIDE-C	9C
	VIDEO PH	80
A42 : YC DL/Y TR VR	Y/C DELAY M-A	80
	Y/C DELAY M-B	80
	Y/C DELAY O-A	A0
	Y/C DELAY O-B	A0
	Y TR OFFSET	A0



DM-124 Board (Side A)

8-8-4. Cosine Equalizer Adjustment

Note

If the network analyzer is not available, refer to "8-8-5. Cosine Equalizer Provisional Adjustment".

Equipment/Fixtures

- Oscilloscope :
  TEKTRONIX TDS460A or equivalent
- Network analyzer :
  ANRITSU MS-420B or equivalent
- Analog composite video monitor

  Note

  This monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.

- Alignment tapes : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)
  CR5-2A PS (Part No. 8-960-098-44)
  CR5-2A (Part No. 8-960-097-44)
- Shorting clip

1. Preparation

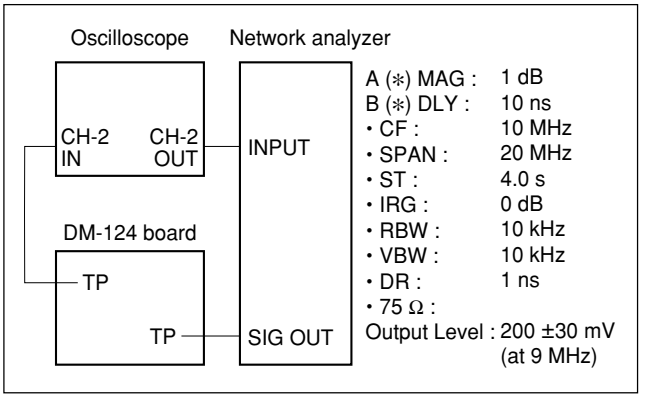
1. Change of switch settings on DM-124 board

S1801 (C-2) : Bit-5 (AGC OFF) → ON
Bit-6 (DO ADJ) → ON

Leave other switches to factory settings. (All of them are set to OFF.)
(Refer to Section 8-8-2 step 1.)

2. Connection and setting of network analyzer

Connect the network analyzer to the oscilloscope and set it.



3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

2. Adjustment in 625 System

1. Maintenance mode start-up and initial data check

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A35 : G-BAND/OMC DC VR.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM DM → A35 : G-BAND/OMC DC VR
   Check that the specified data are set to items of A35 : G-BAND/OMC DC VR shown below. (This is OMC DC offset data check)

Item (A35 : G-BAND/OMC DC VR)	Set data
OMC DC METAL-Y	EB
OMC DC METAL-C	D6
OMC DC OXIDE-Y	D6
OMC DC OXIDE-C	D6

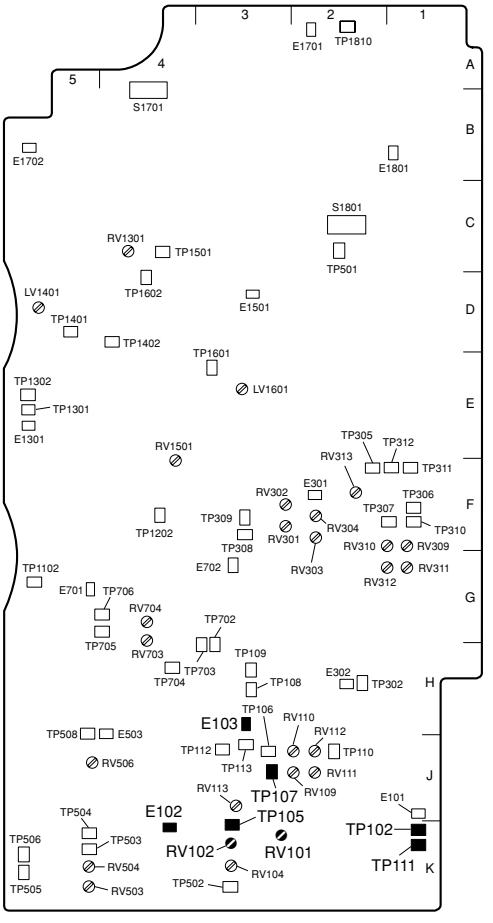
4. Press the MENU (SHIFT + SET) button once to exit A35 : G-BAND/OMC DC VR.

Perform step 5 only when the DM-124 board or NV-RAM (IC1805/DM-124 board) was replaced.

5. Check that the specified initial data for 625 system are set in the following items.
   (For initial data, refer to Section 8-8-3.)
   - A31 : COS EQ VR (METAL-Y)
   - A32 : COS EQ VR (METAL-C)
   - A33 : COS EQ VR (OXIDE-Y)
   - A34 : COS EQ VR (OXIDE-C)

2. METAL Y adjustment (625)

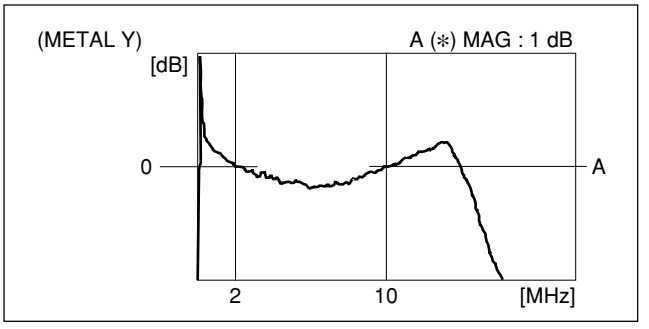
1. Short between TP111/DM-124 (K-1) and E103/DM-124 (H-3) with a shorting clip.
2. Connect the output of the network analyzer to TP102/DM-124 (K-1). GND : E103/DM-124 (H-3)
3. Insert the alignment tape CR5-1B PS and play it back. (PLAY mode)



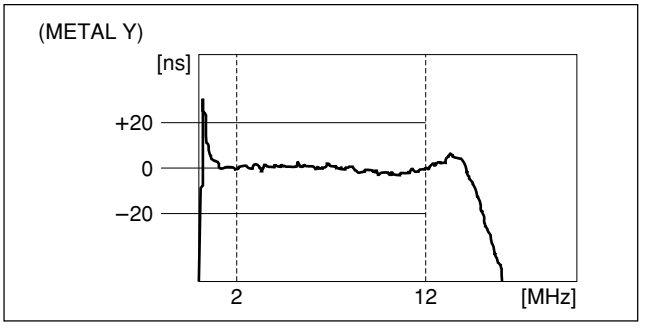
DM-124 Board (Side A)

(Group delay adjustment/METAL Y)

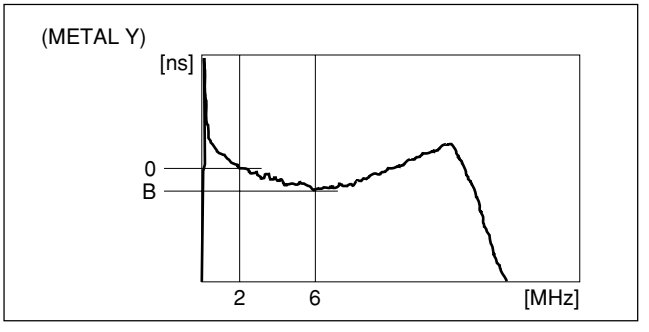
4. Connect CH-2 input of oscilloscope to TP105/DM-124 (K-3). GND : E102/DM-124 (K-4).
5. Enter A31 : COS EQ VR (METAL-Y).
6. Adjust temporarily the level at 10 MHz using the level at 2 MHz as the reference.
   Adjusting location : A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A
   Specification : A = 0 ±0.5 dB



7. Adjust the delay time in the range of 2 MHz through 12 MHz.
   Adjusting locations : ⊘RV101/DM-124 (K-3) and ⊘RV102/DM-124 (K-3)
   Specification : 0 ±20 ns

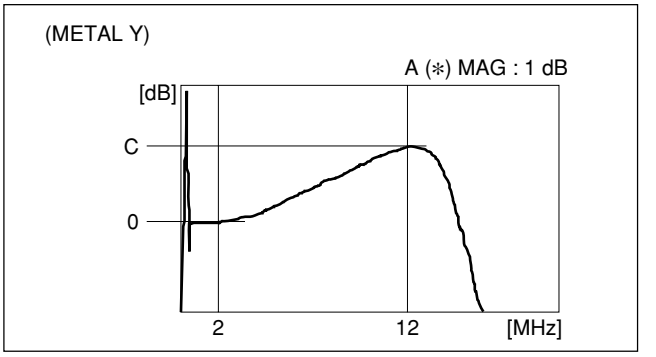


8. Adjust delay time at 6 MHz using the delay time at 2 MHz as the reference.
   Adjusting location : ⊘RV101/DM-124 (K-3)
   Specification : B = −20 ±5 ns



(Main adjustment/METAL Y)

9. Connect CH-2 input of the oscilloscope to TP107/DM-124 (J-3). GND : E102/DM-124 (K-4).
10. Adjust the level at 12 MHz using the level at 2 MHz as the reference.
    Adjusting location : A31 : COS EQ VR (METAL-Y) : MAIN METAL-Y-A
    Specification : C= +2.0 ±0.5 dB



11. Set data of “MAIN METAL-Y-B” in A31 : COS EQ VR (METAL-Y) to the same value of “MAIN METAL-Y-A”.

(Sub-adjustment/METAL Y)

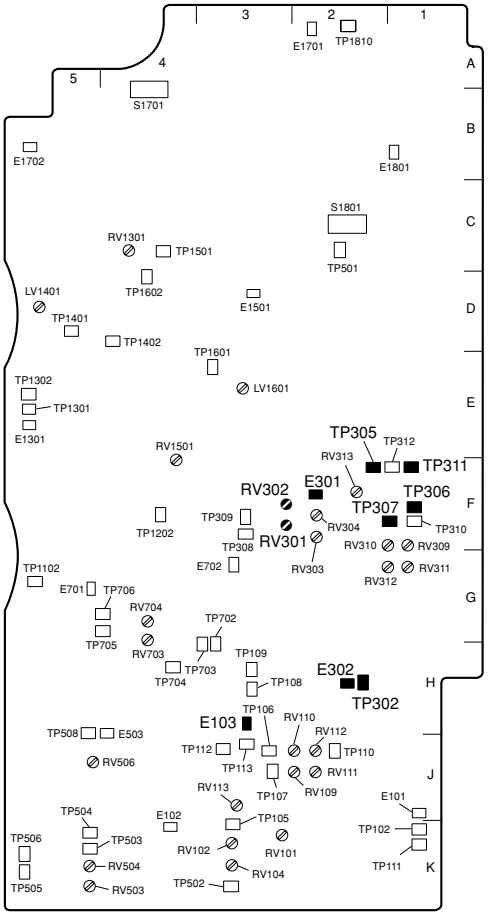
12. Check that the data of “SUB METAL-Y-A” and “SUB METAL-Y-B” in A31 : COS EQ VR (METAL-Y) are 90. (If not, set them to 90.)
13. Reset data of “SUB METAL-Y-A” in A31 : COS EQ VR (METAL-Y) to the initial data “88”.
14. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ (METAL-Y).
15. Remove the shorting clip from TP111/DM-124 (K-1) and E103/DM-124 (H-3).

3. METAL C adjustment (625)

1. Short between TP311/DM-124 (F-1) and E301/DM-124 (F-2) with a shorting clip.
2. Connect the output of the network analyzer to TP302/DM124 (H-2). GND : E103/DM-124 (H-3)

Note

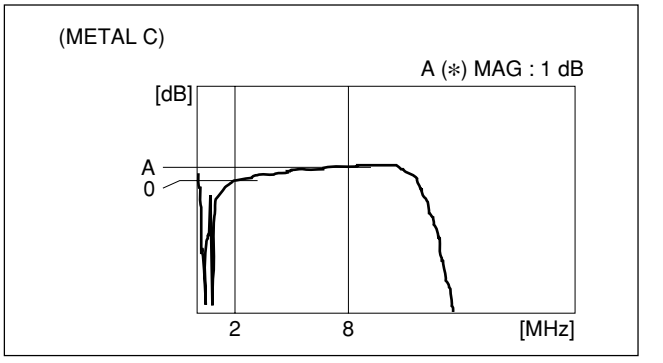
Keep the alignment tape CR5-1B PS inserted.
(PLAY mode)



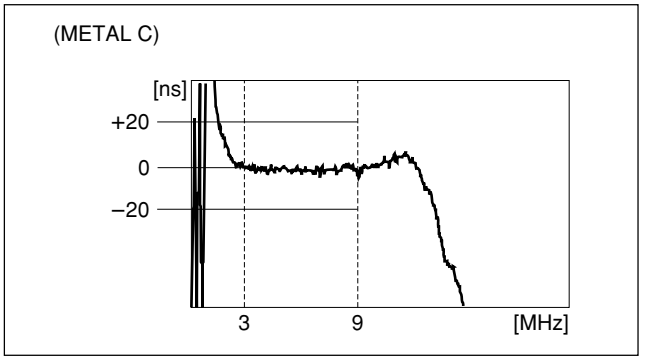
DM-124 Board (Side A)

Group delay adjustment/METAL C)

3. Connect CH-2 input of the oscilloscope to TP305/DM-124 (F-2). GND : E302/DM-124 (H-2)
4. Enter A32 : COS EQ VR (METAL-C).
5. Adjust temporarily the level at 8 MHz using the level at 2 MHz as the reference.
   Adjusting location : A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A.
   Specification : A= 0 ±0.5 dB

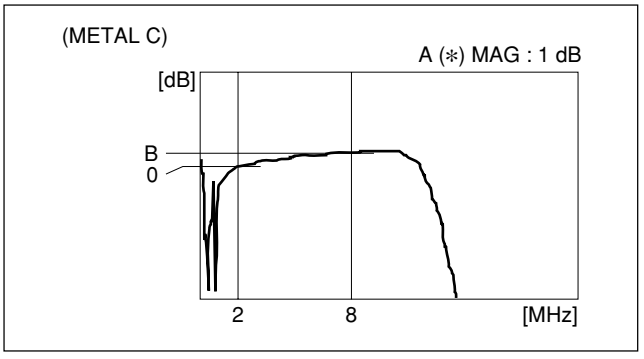


6. Adjust the delay time in the range of 3 MHz through 9 MHz.
   Adjusting locations : ⊘RV301/DM-124 (F-3) and ⊘RV301/DM-124 (F-3)
   Specification : 0 ±20 ns



(Main adjustment/METAL C)

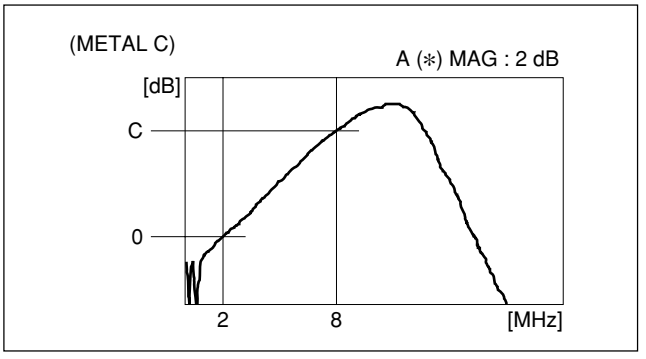
7. Connect CH-2 input of the oscilloscope to TP307/DM-124 (F-2). GND : E302/DM-124 (H-2).
8. Adjust the level at 8 MHz using the level at 2 MHz as the reference.
   Adjusting location : A32 : COS EQ VR (METAL-C) : MAIN METAL-C-A
   Specification : B = +0.5 ±0.5 dB



9. Set data of "MAIN METAL-C-B" in A31 : COS EQ VR (METAL-C) to the same data of "MAIN METAL-C-A".

(Sub-adjustment/METAL C)

10. Connect CH-2 input of the oscilloscope to TP306/DM-124 (F-1). GND : E302/DM-124 (H-2).
11. Adjust the level at 8 MHz using the level at 2 MHz as the reference.
    Adjusting location : A32 : COS EQ VR (METAL-C) : SUB METAL-C-A
    Specification : C= +9.2 ±1.0 dB



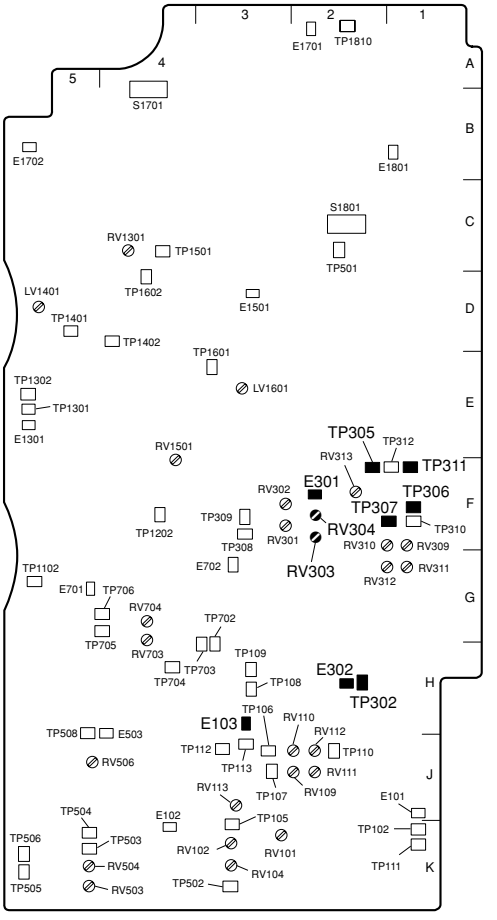
12. Set data of "SUB METAL-C-B" in A32 : COS EQ VR (METAL-C) to the same of "SUB METAL-C-A".
13. Reset data of "EQ1 METAL-C-A" in A32 : COS EQ VR (METAL-C) to the initial data "75".
14. Stop the playback of the alignment tape and eject it. (SET → EJECT → MENU)
15. Press the MENU (SHIFT + SET) button once to exit A32 : COS EQ VR (METAL-C).

4. OXIDE C adjustment (625)

1. Insert the alignment tape CR5-2A PS and play it back. (PLAY mode)

Notes

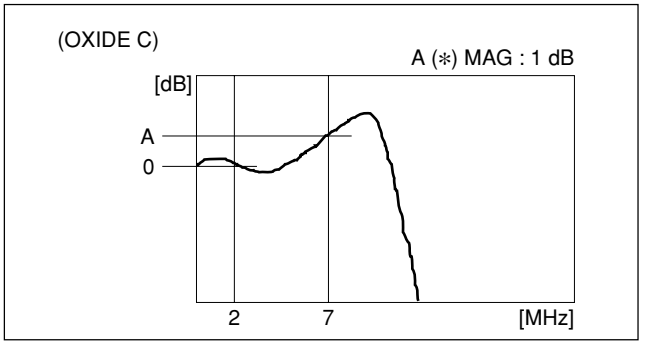
- Keep TP311/DM-124 (F-1) and E301/DM-124 (F-2) shorted.
- Keep the output of the network analyzer connected to TP302/DM-124 (H-2). GND : E103/DM-124 (H-3)



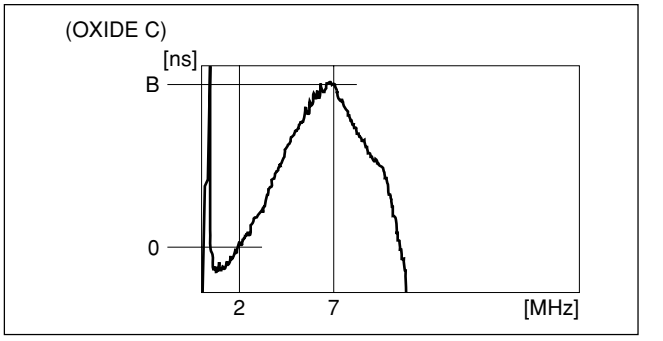
DM-124 Board (Side A)

(Group delay adjustment/OXIDE C)

2. Connect CH-2 input of the oscilloscope to TP305/DM-124 (F-2). GND : E302/DM-124 (H-2)
3. Enter A34 : COS EQ VR (OXIDE-C).
4. Adjust the level at 7 MHz using to the level at 2 MHz as the reference.
   Adjusting location : A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A
   Specification : A = +2.3 ±0.5 dB

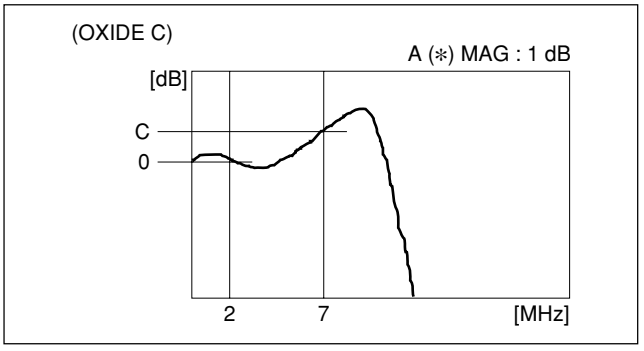


5. Adjust the delay time at 7 MHz using to the delay time at 2 MHz as the reference.
   Adjusting locations : ⊘RV303/DM-124 (F-2) and ⊘RV304/DM-124 (F-2)
   Specification : B = 70 ±5 ns



(Main adjustment/OXIDE C)

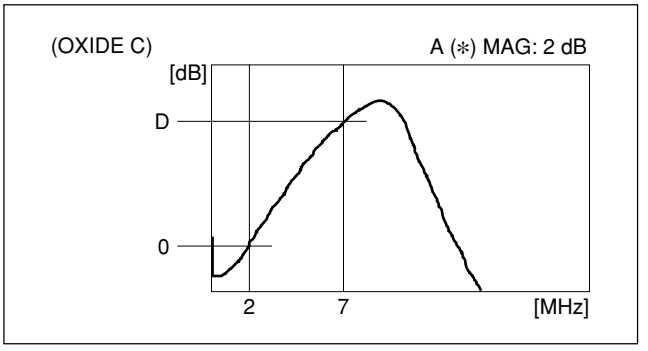
6. Connect CH-2 input of the oscilloscope to TP307/DM-124 (F-2). GND : E302/DM-124 (H-2)
7. Adjust the level at 7 MHz using to the level at 2 MHz as the reference.
   Adjusting location : A34 : COS EQ VR (OXIDE-C) : MAIN OXIDE-C-A
   Specification : C = +3.5 ±0.5 dB



8. Set data of "MAIN OXIDE-C-B" in A34 : COS EQ VR (OXIDE-C) the same data of "MAIN OXIDE-C-A".

(Sub-adjustment/OXIDE C)

9. Connect CH-2 input of the oscilloscope to TP306/DM-124 (F-1). GND : E302/DM-124 (H-2)
10. Adjust the level at 7 MHz using to the level at 2 MHz as the reference.
    Adjusting location : A34 : COS EQ VR (OXIDE-C) : SUB OXIDE-C-A
    Specification : D = +13.0 ±0.5 dB



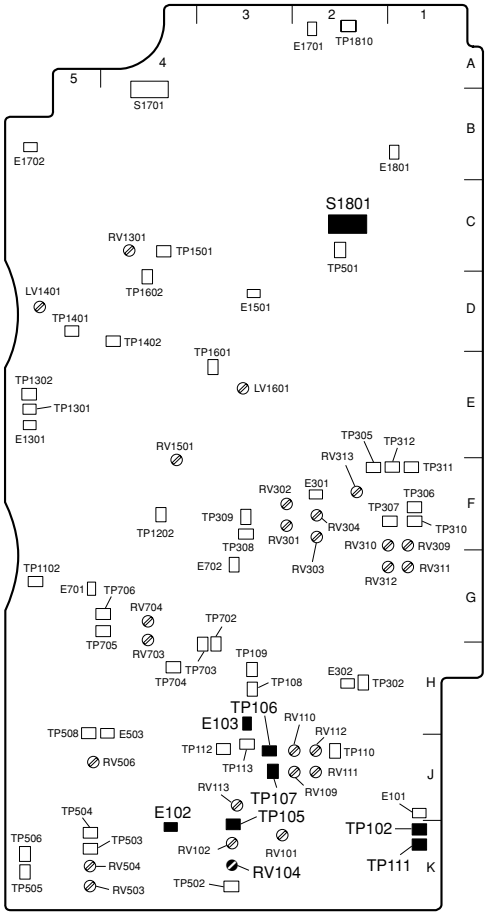
11. Set data of "SUB OXIDE-C-B" in A34 : COS EQ VR (OXIDE-C) the same data of "SUB OXIDE-C-A".
12. Reset data value of "EQ1 OXIDE-C-A" in A34 : COS EQ VR (OXIDE-C) to the initial data "90".
13. Press the MENU (SHIFT + SET) button once to exit A34 : COS EQ VR (OXIDE-C).
14. Remove the shorting clip from TP311/DM-124 (F-1) and E301/DM-124 (F-2).

5. OXIDE Y adjustment (625)

1. Connect TP111/DM-124 (K-1) and E103/DM-124 (H-3) with a shorting clip.
2. Connect the output of the network analyzer to TP102/DM-124 (K-1). GND : E103/DM-124 (H-3)

Note

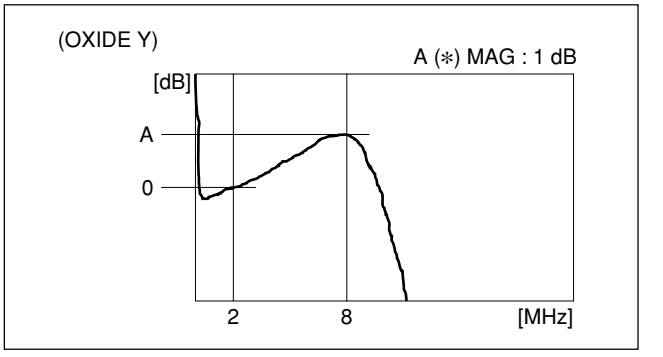
Keep the alignment tape CR5-2A PS inserted.
(PLAY mode)



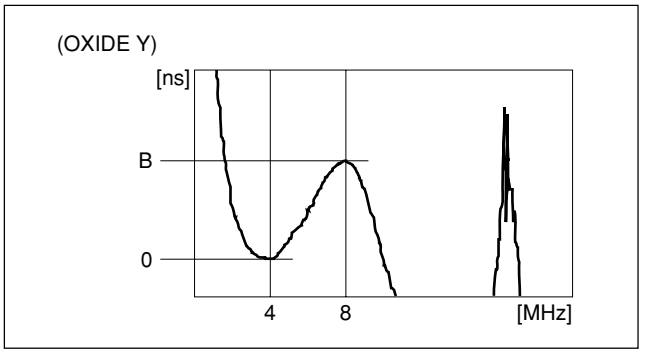
DM-124 Board (Side A)

(Group delay adjustment/OXIDE Y)

3. Connect CH-2 input of the oscilloscope to TP105/DM-124 (K-3). GND : E102/DM-124 (K-4)
4. Enter A33 : COS EQ VR (OXIDE-Y).
5. Adjust temporarily the level at 8 MHz using to the level at 2 MHz as the reference.
   Adjusting location : A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A
   Specification : A = +6.0 ±0.5 dB

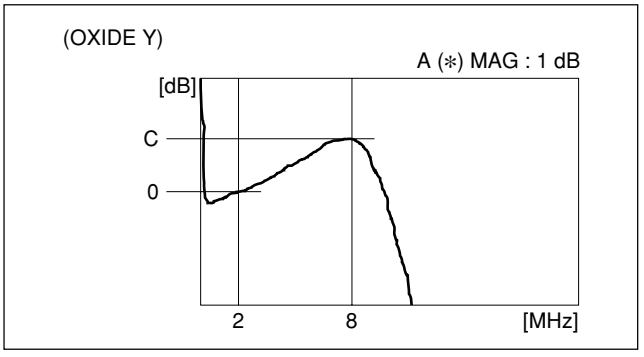


6. Adjust the delay time at 8 MHz using the delay time at 4 MHz as the reference.
   Adjusting location : RV104/DM-124 (K-3)
   Specification : B = 45 ±5 ns



(Main adjustment/OXIDE Y)

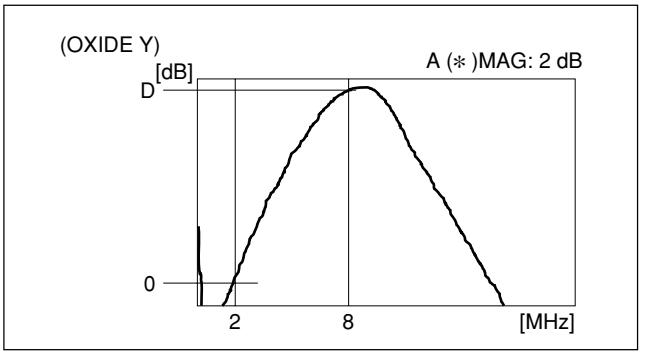
7. Connect CH-2 input of the oscilloscope to TP107/DM-124 (J-3). GND : E102/DM-124 (K-4)
8. Adjust the level at 8 MHz using to the level at 2 MHz as the reference.
   Adjusting location : A33 : COS EQ VR (OXIDE-Y) : MAIN OXIDE-Y-A
   Specification : C = +8.0 ±0.5 dB



9. Set data of "MAIN OXIDE-Y-B" in A33 : COS EQ VR (OXIDE-Y) the same data of "MAIN OXIDE-Y-A".

(Sub-adjustment/OXIDE Y)

10. Connect CH-2 input of the oscilloscope to TP106/DM-124 (J-3). GND : E102/DM-124 (K-4)
11. Adjust the level at 8 MHz using to the level at 2 MHz as the reference.
    Adjusting location : A33 : COS EQ VR (OXIDE-Y) : SUB OXIDE-Y-A
    Specification : D = +20.0 ±0.5 dB



12. Set data of "SUB OXIDE-Y-B" in A33 : COS EQ VR (OXIDE-Y) the same data of "SUB OXIDE-Y-A".
13. Reset data value of "EQ1 OXIDE-Y-A" in A33 : COS EQ VR (OXIDE-Y-A) to the initial data "89".
14. Stop the playback of the alignment tape and eject it. (SET → EJECT → MENU)
15. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE-Y).
16. Remove the shorting clip from TP111/DM-124 (K-1) and E103/DM-124 (H-3).
17. Set Bit-5 and Bit-6 of S1801/DM-124 (C-2) to OFF.

6. Data save (save of 625 system adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

2. Adjustment in 525 System

Note

When the unit is mainly used in 625 system, the adjustment in 525 system is not necessary.

1. Maintenance mode start-up and initial data check

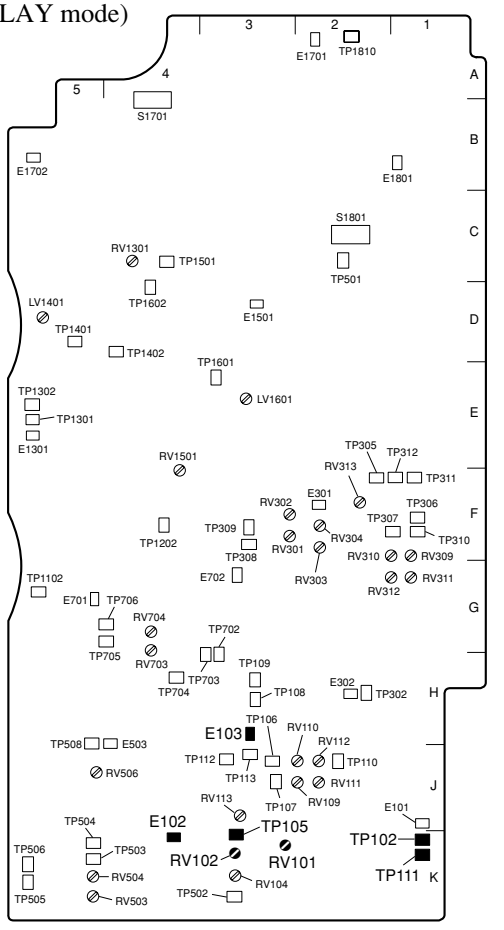
1. Change the unit to the 525 system.
2. Start up the maintenance mode.

Perform step 3 only when the DM-124 board or NV-RAM (IC1805/DM-124 board) was replaced.

3. Check that the initial data are set in the items below. (For initial data, refer to Section 8-8-3.)
   - A31 : COS EQ VR (METAL)
   - A33 : COS EQ VR (OXIDE)

2. METAL Y adjustment (525)

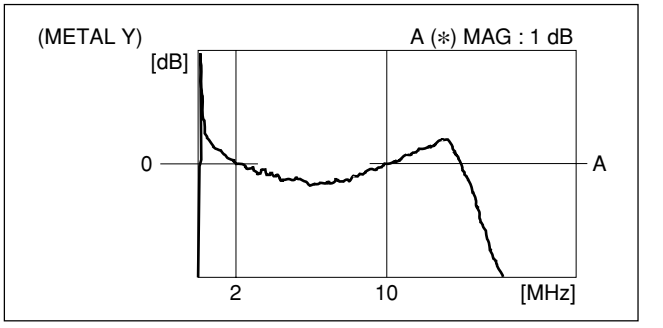
1. Short between TP111/DM-124 (K-1) and E103/DM-124 (H-3) with a shorting clip.
2. Connect the output of the network analyzer to TP102/DM-124 (K-1). GND : E103/DM-124 (H-3)
3. Insert the alignment tape CR5-1B and play it back. (PLAY mode)



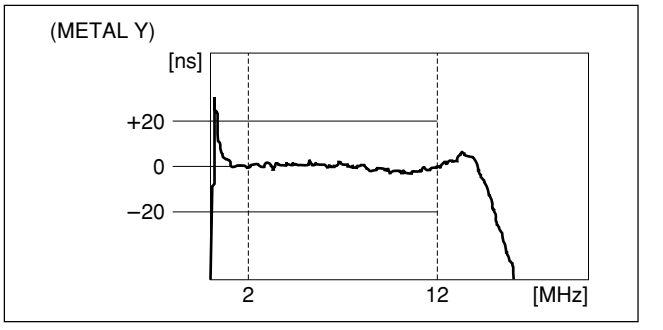
DM-124 Board (Side A)

(Group delay adjustment/METAL Y)

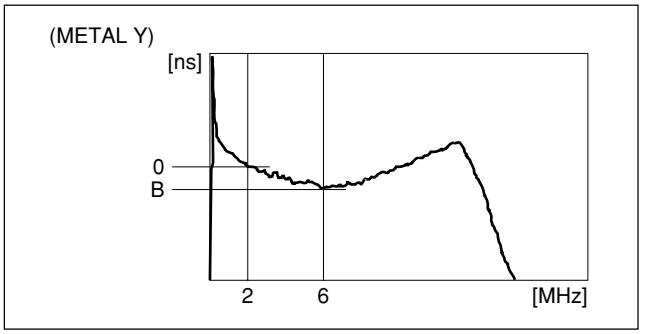
4. Connect CH-2 input of the oscilloscope to TP105/DM-124 (K-3). GND : E102/DM-124 (K-4)
5. Enter A31 : COS EQ VR (METAL).
6. Adjust temporarily the level at 10 MHz using the level at 2 MHz as the reference.
   Adjusting location : A31 : COS EQ VR (METAL) : EQ1 METAL-Y-A
   Specification : A = 0 ±0.5 dB



7. Adjust the delay time in the range of 2 MHz through 12 MHz.
   Adjusting locations : ⊘RV101/DM-124 (K-3) and ⊘RV102/DM-124 (K-3)
   Specification : 0 ±20 ns



8. Adjust the delay time at 6 MHz using the delay time at 2 MHz as the reference.
   Adjusting location : ⊘RV101/DM-124 (K-3)
   Specification : B = −20 ±5 ns



(Sub-adjustment/METAL Y)

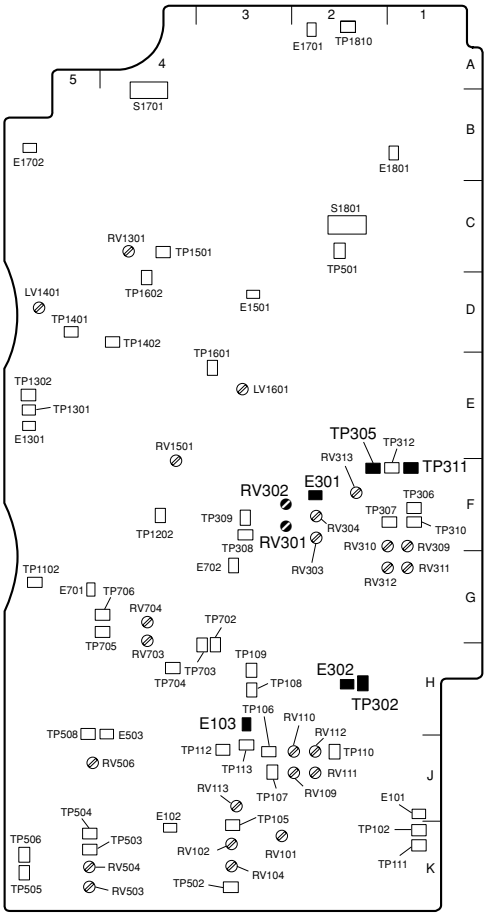
9. Check that the data of "SUB METAL-Y-A" and "SUB METAL-Y-B" in A31 : COS EQ VR (METAL) are "60".
   (If not, set them to 60.)
10. Reset the data of "EQ1 METAL-Y-A" in A31 : COS EQ VR (METAL) to the initial data "86".
11. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL).
12. Remove the shorting clip from TP111/DM-124 (K-1) and E103/DM-124 (H-3).

3. METAL C adjustment (525)

1. Short between TP311/DM-124 (F-1) and E301/DM-124 (F-2) with a shorting clip.
2. Connect the output of the network analyzer to TP302/DM-124 (H-2). GND : E103/DM-124 (H-3)

Note

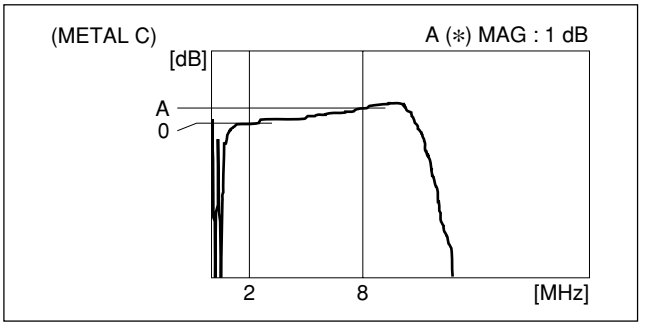
Keep the alignment tape CR5-1B inserted.
(PLAY mode)



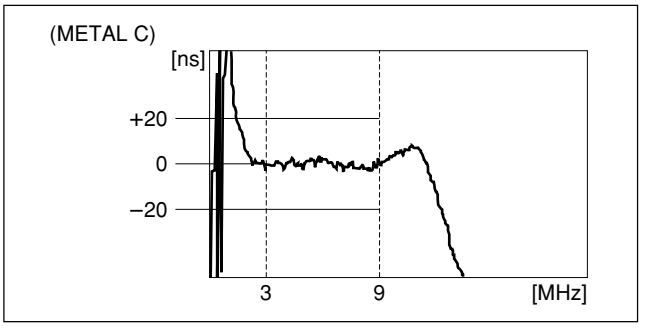
DM-124 Board (Side A)

(Group delay adjustment/METAL C)

3. Connect CH-2 input of the oscilloscope to TP305/DM-124 (F-2). GND : E302/DM-124 (H-2)
4. Enter A31 : COS EQ VR (METAL).
5. Adjust temporarily the level at 8 MHz using the level at 2 MHz as the reference.
   Adjusting location : A31 : COS EQ VR (METAL) : EQ1 METAL-C-A
   Specification : A = 0 ±0.5 dB



6. Adjust the delay time in the range of 3 MHz through 9 MHz.
   Adjusting locations : ⊘RV301/DM-124 (F-3) and ⊘RV302/DM-124 (F-3)
   Specification : 0 ±20 ns



(Sub-adjustment/METAL C)

7. Check that the data of "SUB METAL-C-A" and "SUB METAL-C-B" in A31 : COS EQ VR (METAL) to "5A".
   (If not, set them to 5A.)
8. Reset the data of "EQ1 METAL-C-A" in A31 : COS EQ VR (METAL) to the initial data "6D".
9. Stop the playback of the alignment tape and eject it. (SET → EJECT → MENU)
10. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL).

4. OXIDE C adjustment (525)

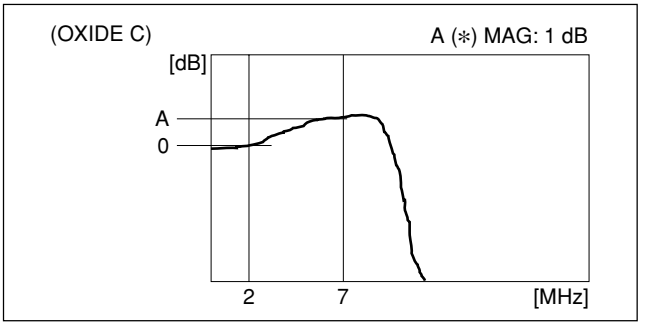
1. Insert the alignment tape CR5-2A and play it back. (PLAY mode)

Notes

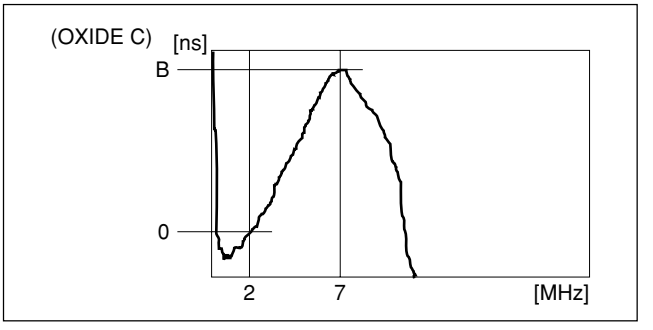
- Keep TP311/DM-124 (F-1) and E301/DM-124 (F-2) shorted.
- Keep the output of the network analyzer connected to TP302/DM-124 (H-2). GND : E103/DM-124 (H-3)

(Group delay/OXIDE C)

2. Connect CH-2 input of the oscilloscope to TP305/DM-124 (F-2). GND : E302/DM-124 (H-2)
3. Enter A33 : COS EQ VR (OXIDE).
4. Adjust temporarily the level at 7 MHz using the level at 2 MHz as the reference.
   Adjusting location : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-A
   Specification : A = +2.3 ±0.5 dB

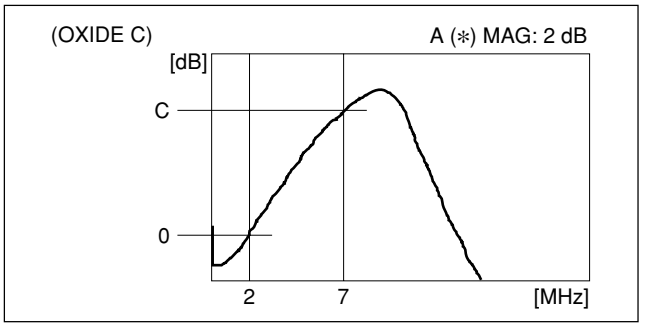


5. Adjust the delay time at 7 MHz using the delay time at 2 MHz as the reference.
   Adjusting locations : ◓RV303/DM-124 (F-2) and ◓RV304/DM-124 (F-2)
   Specification : B = 70 ±5 ns

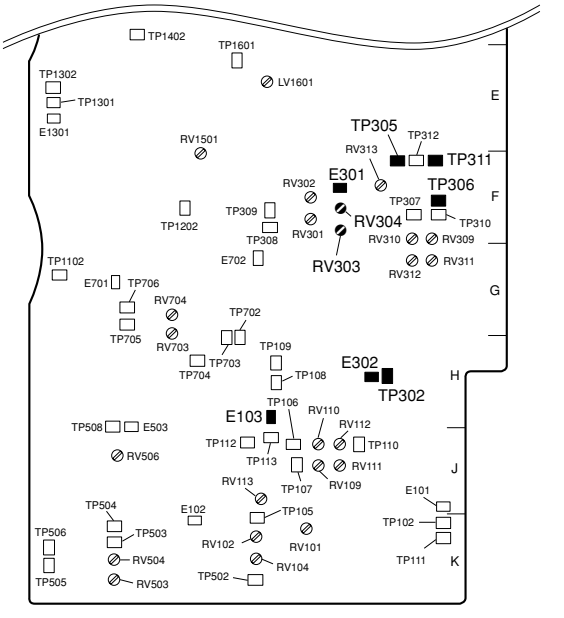


(Sub-adjustment/OXIDE C)

6. Connect CH-2 input of the oscilloscope to TP306/DM-124 (F-1). GND : E302/DM-124 (H-2)
7. Adjust the level at 7 MHz using the level at 2 MHz as the reference.
   Adjusting location : A33 : COS EQ VR (OXIDE) : SUB OXIDE-C-A
   Specification : A = +13.0 ±0.5 dB



8. Set the data of "SUB OXIDE-C-B" in A33 : COS EQ VR (OXIDE) to the same data of "SUB OXIDE-C-A".
9. Reset the data of "EQ1 OXIDE-C-A" in A33 : COS EQ VR (OXIDE) to the initial data "80".
10. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE).
11. Remove the shorting clip from TP311/DM-124 (F-1) and E301/DM-124 (F-2).



DM-124 Board (Side A)

5. OXIDE Y adjustment (525)

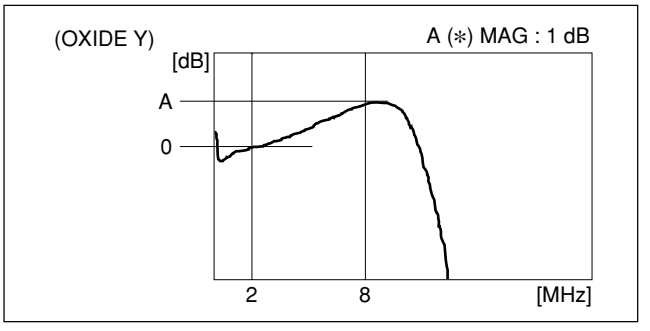
1. Short between TP111/DM-124 (K-1) and E103/DM-124 (H-3) with a shorting clip.
2. Connect the output of the network analyzer to TP102/DM-124 (K-1). GND : E103/DM-124 (H-3)

Note

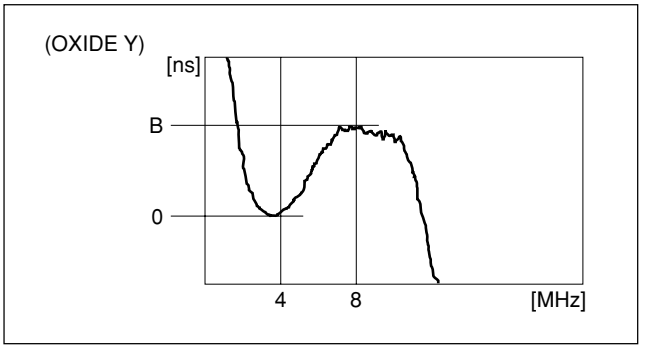
Keep the alignment tape CR5-2A inserted.
(PLAY mode)

(Group delay adjustment/OXIDE Y)

3. Connect CH-2 input of the oscilloscope to TP105/DM-124 (K-3). GND : E102/DM-124 (K-4)
4. Enter A33 : COS EQ VR (OXIDE).
5. Adjust temporarily the level at 8 MHz using the level at 2 MHz as the reference.
   Adjusting location : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-A
   Specification : A = +6.0 ±0.5 dB

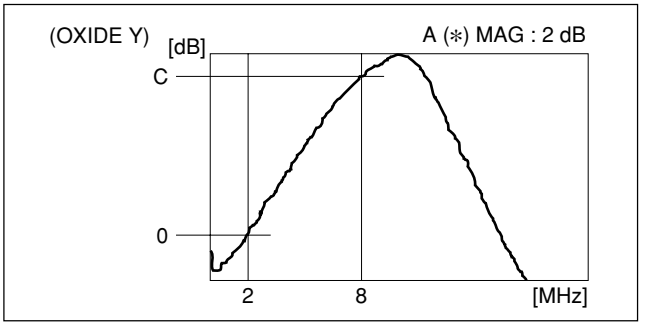


6. Adjust the delay time at 8 MHz using the delay time at 4 MHz as the reference.
   Adjusting location : ⊘RV104/DM-124 (K-3)
   Specification : B = 45 ±5 ns

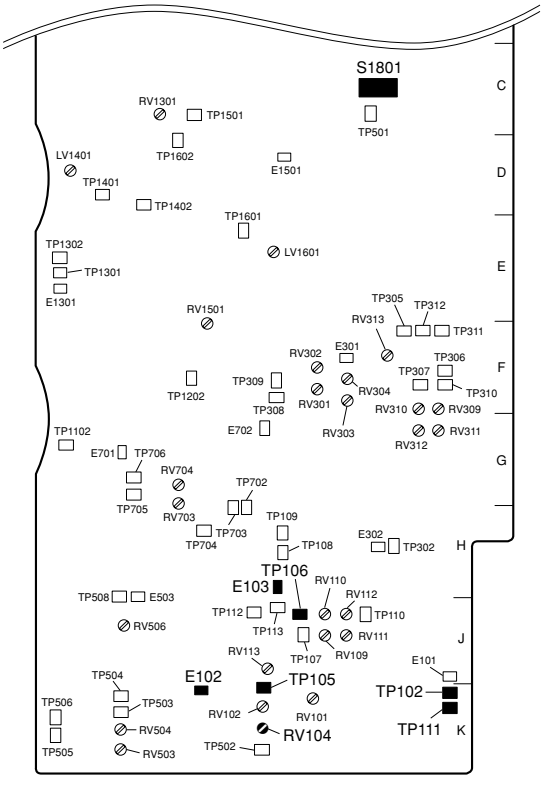


(Sub-adjustment/OXIDE Y)

7. Connect CH-2 input of the oscilloscope to TP106/DM-124 (J-3). GND : E102/DM-124 (K-4)
8. Adjust the level at 8 MHz using the level at 2 MHz as the reference.
   Adjusting location : A33 : COS EQ VR (OXIDE) : SUB OXIDE-Y-A
   Specification : C = +20.0 ±0.5 dB



9. Set the data of "SUB OXIDE-Y-B" in A33 : COS EQ VR (OXIDE) to the same data of "SUB OXIDE-Y-A".
10. Reset the data of "EQ1 OXIDE-Y-A" in A33 : COS EQ VR (OXIDE) to the initial data "8A".
11. Stop the playback of the alignment tape and eject it. (SET → EJECT → MENU)
12. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE).
13. Remove the shorting clip from TP111/DM-124 (K-1) and E103/DM-124 (H-3).
14. Set Bit-5 and Bi5-6 of S1801/DM-124 (C-2) to OFF.



DM-124 Board (Side A)

6. Data save (save of 525 system adjusted data)

1. Select A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

8-8-5. Cosine Equalizer Provisional Adjustment

Notes

- Section 8-8-5 is the provisional adjustment when the network analyzer is not available.
  When "8-8-4. Cosine Equalizer Adjustment" is implemented, this adjustment is not necessary.
- Only when in emergency or the network analyzer is not available, perform the provisional adjustment.
  But, later on, perform the "8-8-4. Cosine Equalizer Adjustment" using the network analyzer.

Equipment

- Analog composite video monitor

  Note

  This monitor is used to display the menu.
  Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.

1. Adjusted Data Setting of 625 System

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Set the specified data in the items below.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM DM

Item (A3 : BETACAM DM/625 system)		Set data
A31 : COS EQ VR (METAL-Y)	MAIN METAL-Y-A	9F
	MAIN METAL-Y-B	9F
	SUB METAL-Y-A	90
	SUB METAL-Y-B	90
A32 : COS EQ VR (METAL-C)	MAIN METAL-C-A	97
	MAIN METAL-C-B	97
	SUB METAL-C-A	97
	SUB METAL-C-B	97
A33 : COS EQ VR (OXIDE-Y)	MAIN OXIDE-Y-A	B8
	MAIN OXIDE-Y-B	B8
	SUB OXIDE-Y-A	89
	SUB OXIDE-Y-B	89
A34 : COS EQ VR (OXIDE-C)	MAIN OXIDE-C-A	A7
	MAIN OXIDE-C-B	A7
	SUB OXIDE-C-A	AD
	SUB OXIDE-C-B	AD

4. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

5. Terminate the maintenance mode.

2. Adjusted Data Setting of 525 System

1. Change the unit to the 525 system.
2. Start up the maintenance mode.
3. Set the specified data in the items below.
   Maintenance Mode → M1 : ADJUST → A3 : BETA-CAM DM

Item (A3 : BETACAM DM-525 system)		Set data
A31 : COS EQ VR (METAL)	SUB METAL-Y-A	60
	SUB METAL-Y-B	60
	SUB METAL-C-A	5A
	SUB METAL-C-B	5A
A33 : COS EQ VR (OXIDE)	SUB OXIDE-Y-A	8A
	SUB OXIDE-Y-B	8A
	SUB OXIDE-C-A	71
	SUB OXIDE-C-B	71

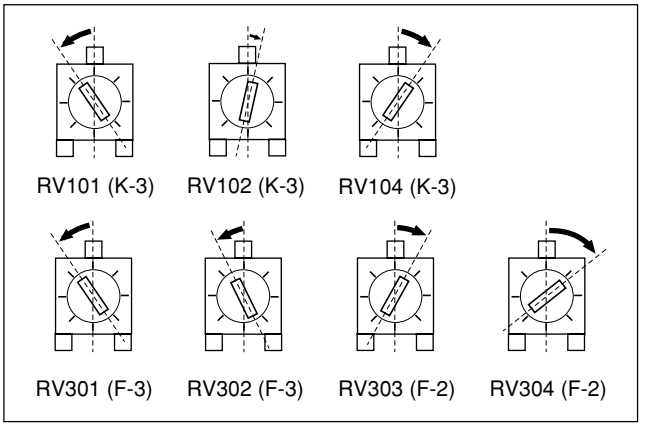
4. Select A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on The video monitor.

5. Terminate the maintenance mode.

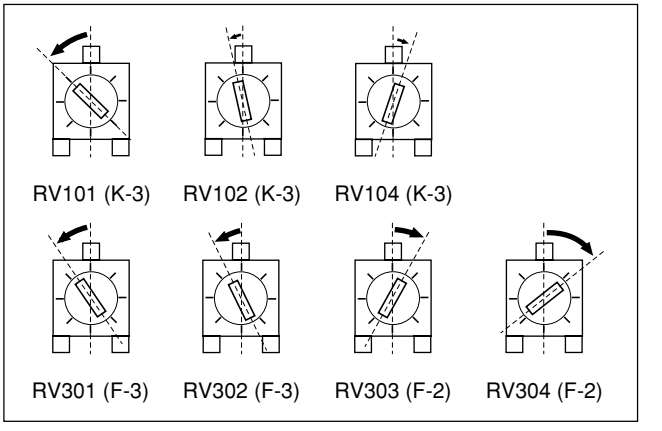
3. Adjustment of Component

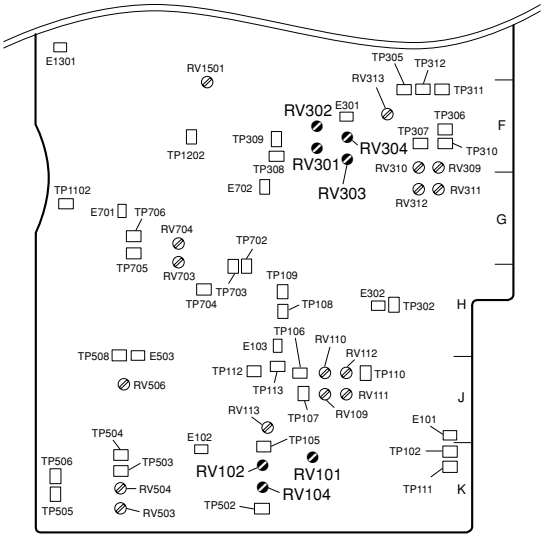
Set the components on the DM-124 board as shown below.

• In case that the unit is mainly used in 625 system:



• In case that the unit is mainly used in 525 system:





DM-124 Board (Side A)

8-8-6. DM RF Output Level Adjustment

Equipment/Fixtures

- Oscilloscope :
  TEKTRONIX TDS460A or equivalent
- Alignment tapes : CR5-1B PS (Part No, 8-960-096-91)
  CR5-1B (Part No, 8-960-096-41)
  CR5-2A PS (Part No. 8-960-098-44)
  CR5-2A (Part No. 8-960-097-44)

Preparation

1. Check of switch settings on DM-124 board

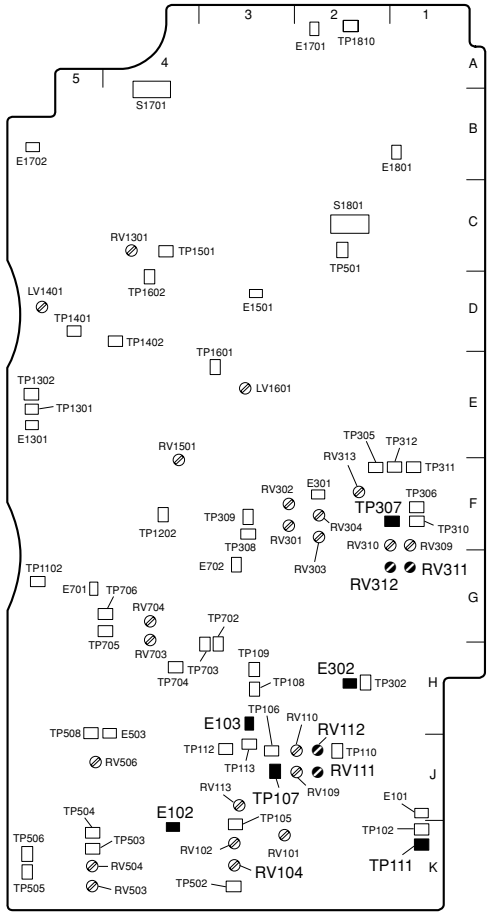
Set S1701 and S1801 to the factory-setting (OFF).

2. Change of video system

Change the unit to the mainly used video system.

3. Warming-up

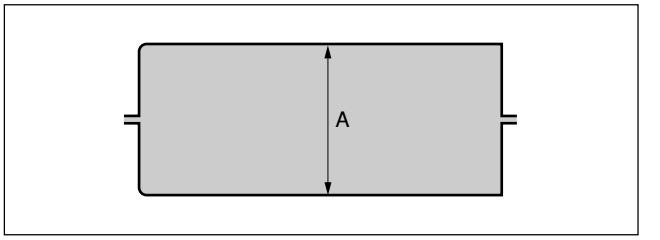
Before starting the adjustment, warm up the unit and oscilloscope through the power for 20 minutes or more.



DM-124 Board (Side A)

1. OXIDE Y Adjustment

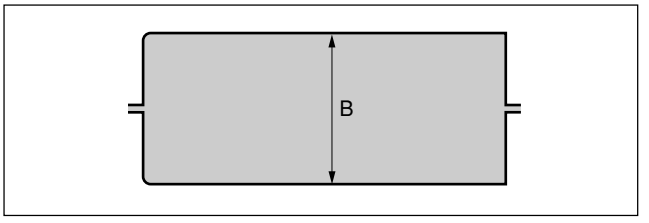
1. Connect and set the oscilloscope as follows.
   CH1 : TP107/DM-124 (J-3) , AC 100 mV/DIV
   GND : E102/DM-124 (K-4)
   CH2 : TP111/DM-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME : 2 ms/DIV
   TRIG : CH-2, − slope
2. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape.
   - 525 system : CR5-2A
   - 625 system : CR5-2A PS
3. Check the level at center of V period.
   If not met the specification, adjust.
   Adjusting location : ⊘RV112/DM-124 (J-2)
   Specification : A = 400 ±40 mV p-p



4. Stop the playback of the alignment tape.

2. OXIDE Adjustment

1. Change CH1 connection of the oscilloscope as follows.
   (Keep the settings and CH-2 connection unchanged.)
   CH-1 : TP307/DM-124 (F-2)
   GND : E302/DM-124 (H-2)
2. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape.
   • 525 system : CR5-2A
   • 625 system : CR5-2A PS
3. Check the level at center of V period.
   If not met the specification, adjust.
   Adjusting location : ⊘RV312/DM-124 (G-1)
   Specification : B = 400 ±40 mV p-p



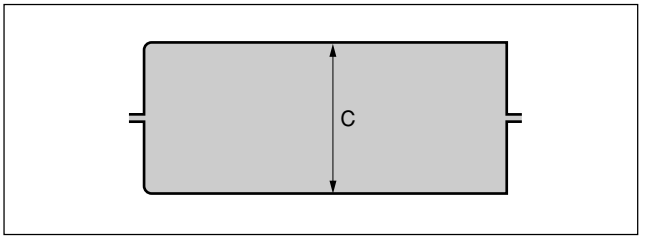
4. Eject the alignment tape.

3. METAL C Adjustment

Note

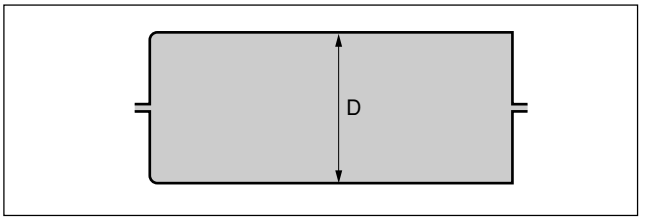
Keep the connection of the oscilloscope unchanged.

1. Play back the 75 % color bars signal (24 : 00 to 26 : 00) of the alignment tape.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
2. Check the level at center of V period.
   If not met the specification, adjust.
   Adjusting location : ⊘RV311/DM-124 (G-1)
   Specification : C = 400 ±40 mV p-p



4. METAL Y Adjustment

1. Change CH1 connection of the oscilloscope as follows.
   (Keep the settings and CH-2 connection unchanged.)
   CH-1 : TP107/DM-124 (J-3)
   GND : E102/DM-124 (K-4)
2. Play back the 75 % color bars signal (24 : 00 to 26 : 00) of the alignment tape.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
3. Check the level at center of V period.
   If not met the specification, adjust.
   Adjusting location : ⊘RV111/DM-124 (J-2)
   Specification : D = 400 ±40 mV p-p



4. Stop the playback of the alignment tape.
5. In case of 525 system, eject the alignment tape.

Note

To continue “8-8-7. OMC Carrier Balance Adjustment” in 625 system, it is not necessary to eject the alignment tape.

8-8-7. OMC Carrier Balance Adjustment (Perform in 625 system.)

Notes

- The adjustment uses the menu exclusive for 625 system. Even if the unit is mainly used in the 525 system, change the unit to the 625 video system.
- If the spectrum analyzer is not available, refer to "8-8-8. OMC Carrier Balance Provisional Adjustment".

Equipment/Fixtures

- Oscilloscope :
  TEKTRONIX TDS460A or equivalent
- Spectrum analyzer :
  ADVANTEST R3261A or equivalent
- Analog composite video monitor

  Note

  This monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.
- Alignment tapes : CR5-1B PS (Part No. 8-960-096-91)
  and CR5-2A PS (Part No. 8-960-098-44)
- Shorting clip

1. Preparation

1. Change of video system

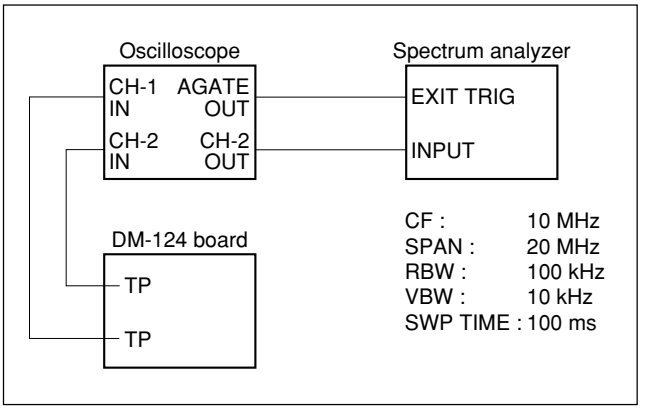
Change the unit to 625 system.

2. Check of switch setting on DM-124 board

Set S1701 and S1801 to the factory-setting (OFF).

3. Connection and setting of spectrum analyzer

Connect the spectrum analyzer to the oscilloscope and set it.

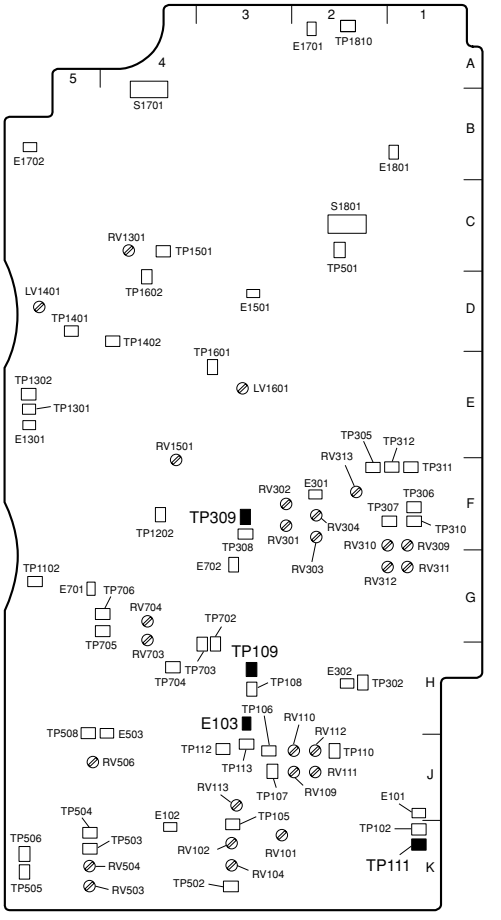


4. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

5. Maintenance mode start-up

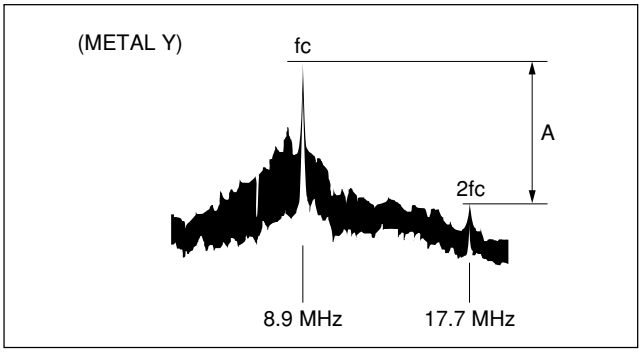
1. Start up the maintenance mode.
2. Enter A37 : OMC LIM BALANCE VR.
   Maintenance Mode → M1 : ADJUST → A3 : METACAM DM → A37 : OMC LIM BALANCE VR



DM-124 Board (Side A)

2. METAL Y Adjustment

1. Connect and set the oscilloscope as follows.
   CH-1: TP111/DM-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   CH-2: TP109/DM-124 (H-3), AC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME: 5 ms/DIV
   TRIG: CH-1, − slope
2. Play back the flat field signal (24 : 00 to 26 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting locations : A37 : OMC LIM BALANCE VR :
   OMC LIM METAL-Y-A and
   OMC LIM METAL-Y-B
   Specification : A ≧ 40 dB

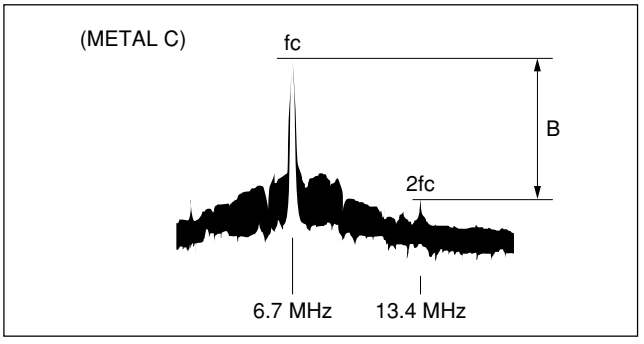


3. Stop the playback of the alignment tape.

3. METAL C Adjustment

1. Change CH-2 connection of the oscilloscope as follows.
   (Keep the settings and CH-1 connection unchanged.)
   CH-2 : TP309/DM-124 (F-3)
   GND : E103/DM-124 (H-3)

2. Play back the flat field signal (24 : 00 to 26 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting locations : A37 : OMC LIM BALANCE VR :
   OMC LIM METAL-C-A and
   OMC LIM METAL-C-B
   Specification : B ≧ 40 dB



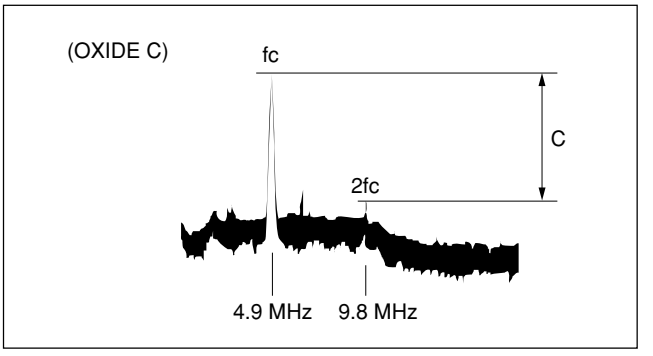
3. Stop the playback of the alignment tape, and eject it.
   (SET → EJECT → MENU)

4. OXIDE C Adjustment

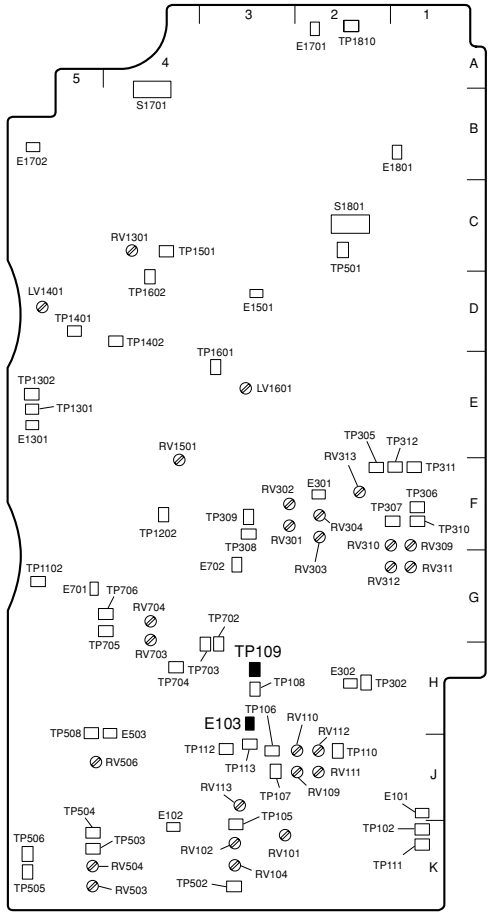
Note

Keep the connection of the oscilloscope unchanged.

1. Play back the pulse and bar signal (09 : 00 to 11 : 00) of the alignment tape CR5-2A PS and adjust.
   Adjusting locations : A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-A and OMC LIM OXIDE-C-B
   Specification: C ≧ 35 dB



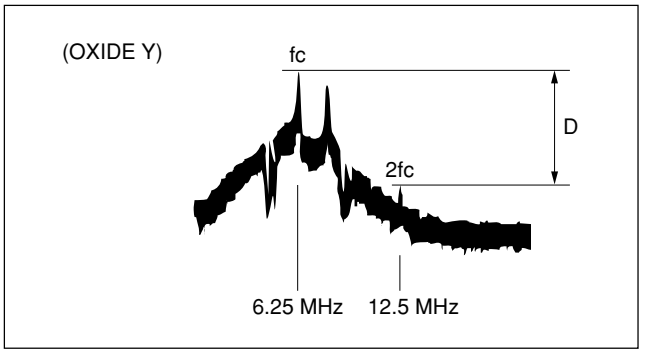
2. Stop the playback of the alignment tape.



DM-124 Board (Side A)

5. OXIDE Y Adjustment

1. Change CH-2 connection of the oscilloscope as follows.
   (Keep the settings and CH-1 connection unchanged.)
   CH-2 : TP109/DM-124 (H-3)
   GND : E103/DM-124 (H-3)
2. Play back the pulse and bar signal (09 : 00 to 11 : 00) of the alignment tape CR5-2A PS and adjust.
   Adjusting locations : A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-A and OMC LIM OXIDE-Y-B
   Specification : D ≧ 35 dB



3. Stop the playback of the alignment tape.
4. Press the MENU (SHIFT + SET) button once to exit A37 : OMC LIM BALANCE VR.

6. Data Save (Save of Adjusted Data)

1. Enter A3F : MV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the save data finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

8-8-8. OMC Carrier Balance Provisional Adjustment (Perform in 625 system.)

In Section 8-8-8, the provisional adjustment is discussed when the spectrum analyzer is not available.
If "8-8-7. OMC Carrier Balance Adjustment" using the spectrum analyzer is performed, the provisional adjustment is not necessary.

Notes

- The adjustment uses the menu exclusive for 625 system. When the unit is mainly used is the 525 system, change the unit to 625 video system.
- If the spectrum analyzer is not available, perform the provisional adjustment.
  But, later ensure to perform "8-8-7. OMC Carrier Balance Adjustment" using the spectrum analyzer.

Equipment

- Analog composite video monitor

  Note

  This monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) on the connector panel.

Setting of Adjusted Data

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A37 : OMC LIM BALANCE VR.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM PB (DM) → A37 : OMC LIM BALANCE VR
4. Change the data in the following items to the initial data.

Item (A37 : OMC LIM BALANCE VR)	Initial data
OMC LIM METAL-Y-A	78
OMC LIM METAL-Y-B	78
OMC LIM METAL-C-A	51
OMC LIM METAL-C-B	51
OMC LIM OXIDE-Y-A	78
OMC LIM OXIDE-Y-B	78
OMC LIM OXIDE-C-A	55
OMC LIM OXIDE-C-B	55

5. Press the MENU (SHIFT + SET) button once to exit A37 : OMC LIM BALANCE VR.
6. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.
7. Terminate the maintenance mode.

8-8-9. Demodulator Limiter Balance Adjustment

Note

When in emergency or the spectrum analyzer is not available, omit steps 5 to 9 in "1. Y Adjustment (625)". But, later perform steps 5 to 9 in "1. Y Adjustment (625)" using the spectrum analyzer.

Equipment/Fixtures

- Oscilloscope:
  TEKTRONIX TDS460A or equivalent
- Spectrum analyzer:
  ADVANTEST R3261A or equivalent
- Analog composite video monitor

  Note

  This monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPONENT 3 (SUPER) connector on the connector panel.

- Alignment tapes : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)
  CR5-2A PS (Part No. 8-960-098-44)
  CR5-2A (Part No. 8-960-097-44)

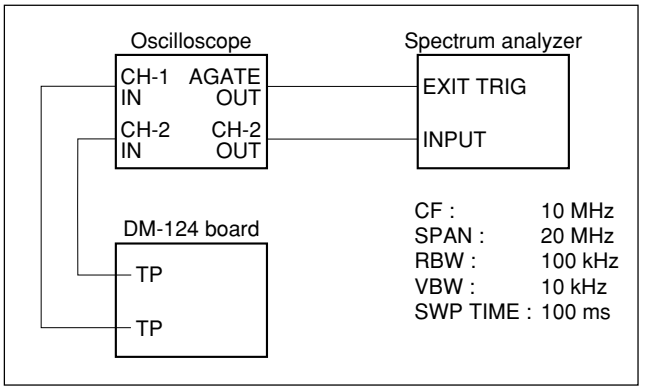
1. Preparation

1. Check of switch setting on DM-124 board

Set S1701 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Connection and setting of spectrum analyzer

Connect the spectrum analyzer to the oscilloscope and set it.



3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

2. Adjustment in 625

1. Y adjustment (625)

Note

When in emergency or the spectrum analyzer is not available, omit steps 5 to 9.
But, later perform "1. Y Adjustment (625)" using the spectrum analyzer.

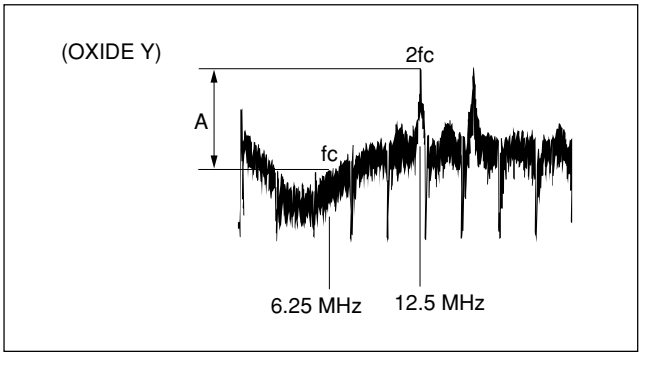
1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A38 : DEMO BAL/ETC. VR.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM DM PB (DM) → A38 : DEMO BAL/ETC. VR
4. Set the initial data in the following items.

Item (A38 : DEMO BAL/ETC. VR)	Initial data
DEMO BAL METAL-Y	80
DEMO BAL METAL-C	80
DEMO BAL OXIDE-Y	83
DEMO BAL OXIDE-C	83

5. Connect and set the oscilloscope as follows.
   CH-1 : TP111/D-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   CH-2 : TP502/D-124 (K-3), AC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME : 5 ms/DIV
   TRIG : CH-1, − slope

(OXIDE Y)

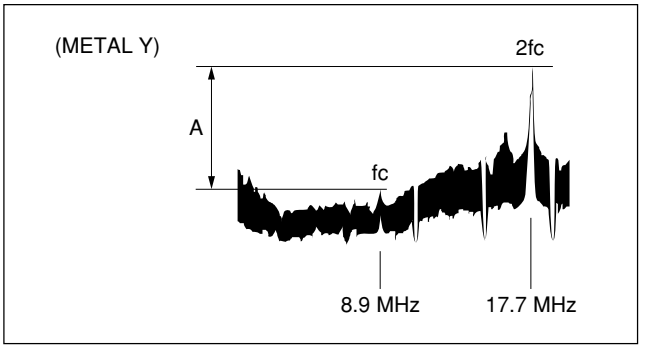
6. Play back the pulse and bars signal (09 : 00 to 11 : 00) of the alignment tape CR5-2A PS and adjust.
   Adjusting location : A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-Y
   Specification : Maximize A. (Minimize fc.)



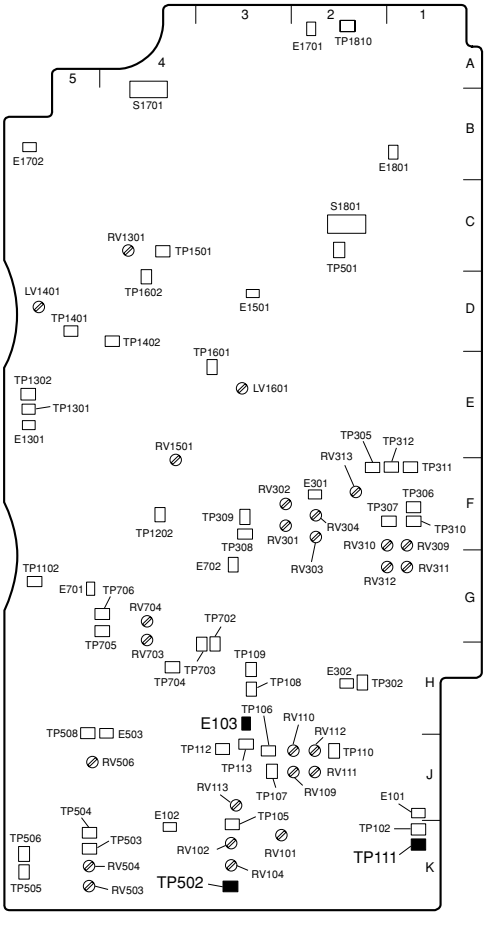
7. Stop the playback of the alignment tape and eject it. (SET → EJECT → MENU)

(METAL Y)

8. Play back the flat field signal (24 : 00 to 26 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting location : A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-Y
   Specification : Maximize B. (Minimize fc.)



9. Stop the playback of the alignment tape.



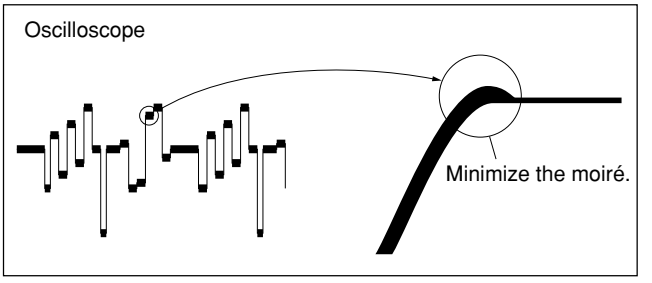
DM-124 Board (Side A)

2. C adjustment (625)

1. Connect and set the oscilloscope as follows.
   CH-1 : TP706/D-124 (G-4), AC 200 mV/DIV
   GND : E503/DM-124 (H-4)
   TIME : 10 µs/DIV

(METAL C)

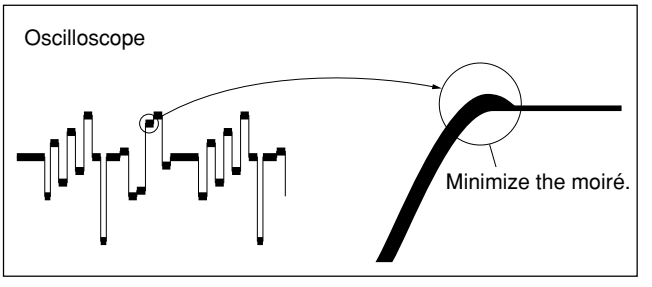
2. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting location : A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-C
   Specification : Minimize the moiré at the specified portion.



3. Stop the playback of the alignment tape and eject it. (SET → EJECT → MENU)

(OXIDE C)

4. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape CR5-2A PS and adjust.
   Adjusting location : A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-C
   Specification : Minimize the moiré at the specified portion.

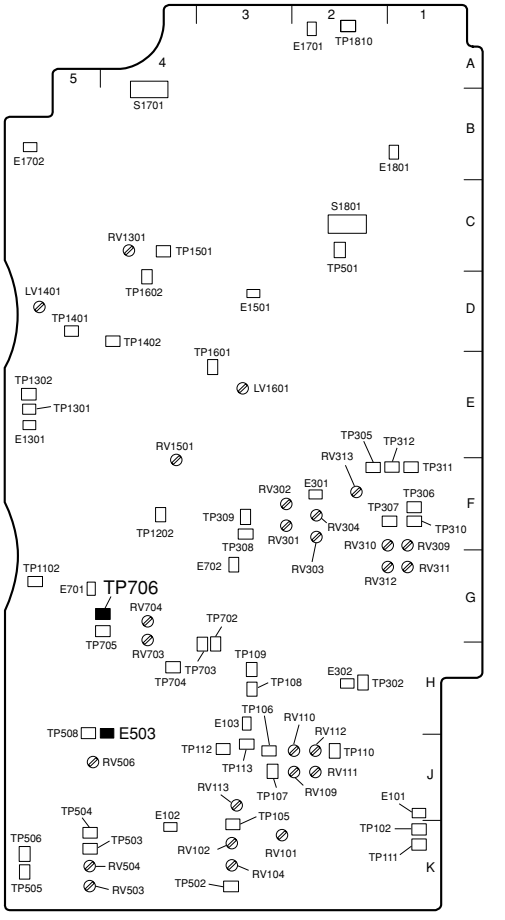


5. Stop the playback of the alignment tape.
6. Press the MENU (SHIFT + SET) button once to exit A38 : DEMO BAL/ETC. VR.

3. Data save (save of 625 system adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.
3. Eject the alignment tape.



DM-124 Board (Side A)

3. Adjustment in 525 System

1. C adjustment (525)

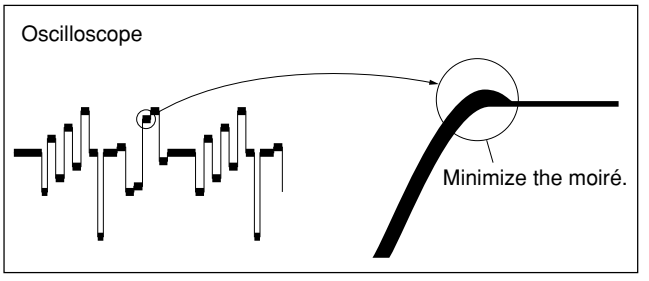
1. Change the unit to the 525 system.
2. Start up the maintenance mode.
3. Enter A38 : DEMO BAL VR.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM DM → A38 : DEMO BAL VR
4. Set the initial data in the following items.

Item (A38 : DEMO BAL VR)	Initial data
DEMO BAL METAL-C	80
DEMO BAL OXIDE-C	83

5. Connect and set the oscilloscope as follows.
   CH-1 : TP706/DM-124 (G-4), AC 200 mV/DIV
   GND : E503/DM-124 (H-4)
   TIME : 10 µs/DIV

(METAL C)

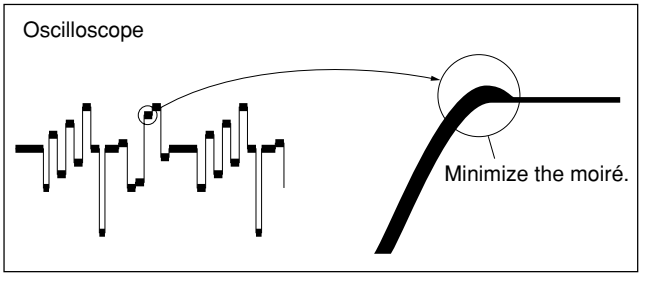
6. Play back the 75 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B and adjust.
   Adjusting location : A38 : DEMO BAL : DEMO BAL METAL-C
   Specification : Minimize the moiré at the specified portion.



7. Stop the playback of the alignment tape and eject it. (SET → EJECT → MENU)

(OXIDE C)

8. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape CR5-2A and adjust.
   Adjusting location : A38 : DEMO BAL : DEMO BAL OXIDE-C
   Specification : Minimize the moiré at the specified portion.

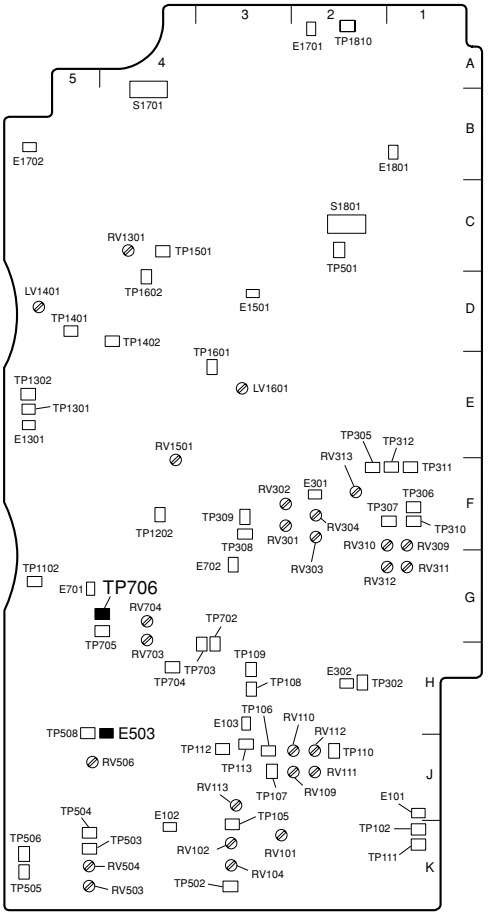


9. Stop the playback of the alignment tape.
10. Press the MENU (SHIFT + SET) button once to exit A38 : DEMO BAL VR.

2. Data save (save of 525 system adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   - When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.
3. Eject the alignment tape.



DM-124 Board (Side A)

8-8-10. Non-linear Output Level Adjustment

Equipment/Fixtures

- Oscilloscope :
  TEKTRONIX TDS460A or equivalent
- Alignment tapes : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)
  CR5-2A PS (Part No. 8-960-098-44)
  CR5-2A (Part No. 8-960-097-44)

Preparation

1. Check of switch settings on DM-124 board

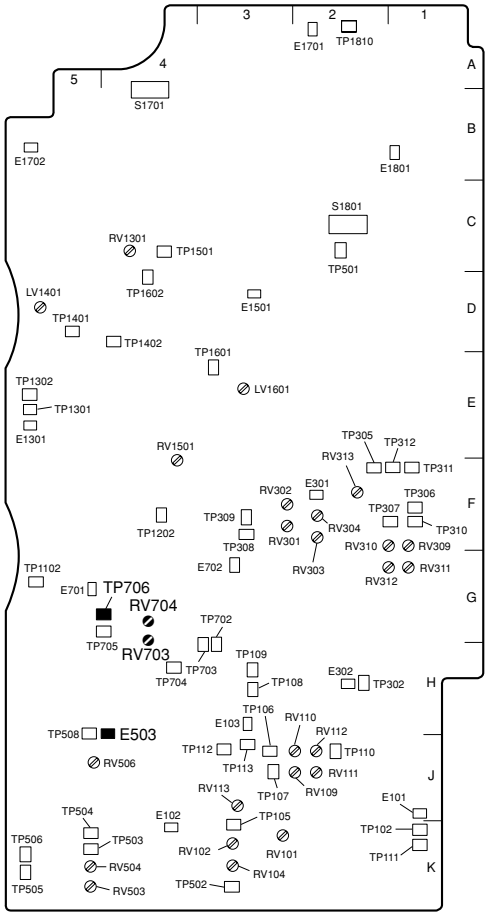
Set S1701 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Change of video system

Change the unit to the 625 system.

3. Warming-up

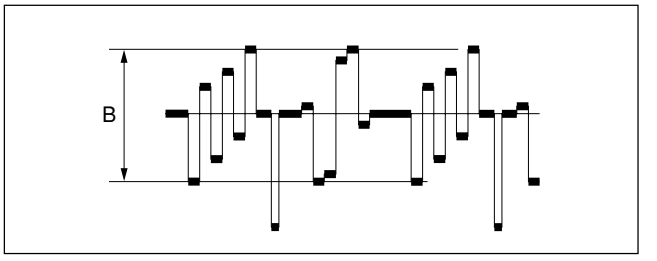
Before starting the adjustment, warm up the unit and oscilloscope through the power for 20 minutes or more.



DM-124 Board (Side A)

1. METAL C Adjustment (Perform in 625 system.)

1. Connect the oscilloscope as follows.
   CH-1 : TP706/DM-124 (G-4), AC 200 mV/DIV
   GND : E503/DM-124 (H-4)
   TIME : 10 µs/DIV
2. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS and adjust.
   Adjusting location : ⊘RV703/DM-124 (G-4)
   Specification : B = 933 ±10 mV



3. Eject the alignment tape.

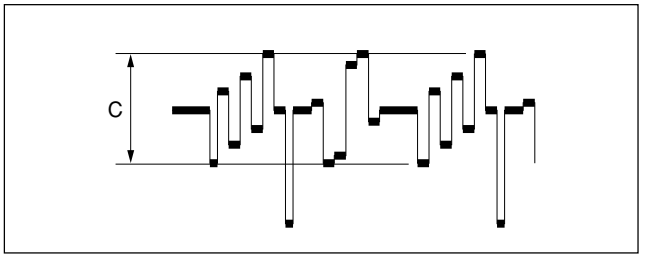
2. C Adjustment

Note

Keep the connection of the oscilloscope unchanged.

1. Change the unit to the mainly used video system.
2. Play back the color bars signal (14 : 00 to17 : 00) of the following alignment tape.
   - 525 system : CR5-1B
   - 625 system : CR5-1B PS

   Adjusting location : ⊘RV704/DM-124 (G-4)
   Specification : C = 700 ±10 mV

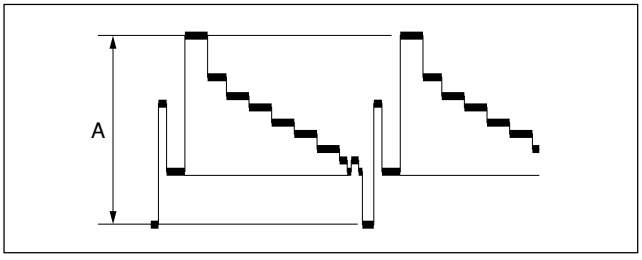


3. Stop the playback of the alignment tape.
4. In case of 625 system, eject the alignment tape.

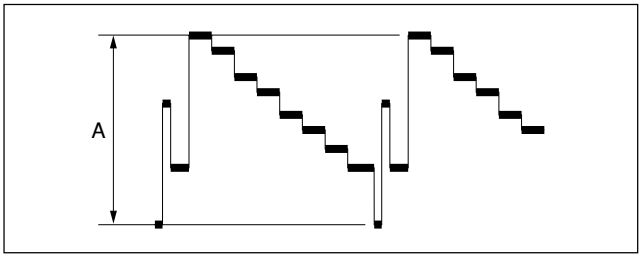
3. METAL Y Adjustment

1. Change the connection of the oscilloscope as follows.
   CH-1 : TP506/DM-124 (K-5)
   GND : E503/DM-124 (H-4)
2. Play back the color bars signal (14 : 00 to17 : 00) of the following alignment tape.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
   Adjusting location : ⊘RV503/DM-124 (K-5)
   Specification : A = 1.00 ±0.01 V

• 525 system



• 625 system



3. Eject the alignment tape.

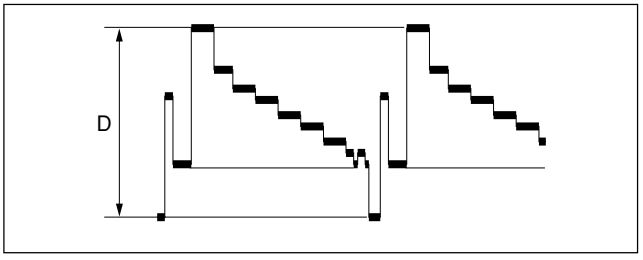
4. OXIDE Y Adjustment

Note

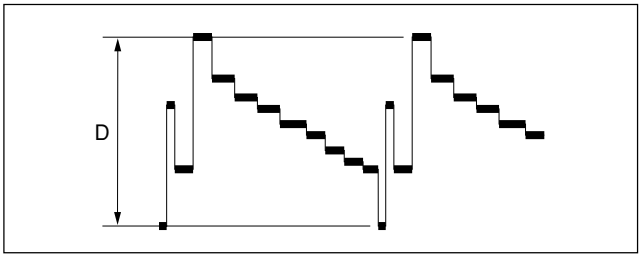
Keep the connection of the oscilloscope unchanged.

1. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the following alignment tape.
   • 525 system : CR5-2A
   • 625 system : CR5-2A PS
   Adjusting location : ⊘RV504/DM-124 (K-5)
   Specification : D = 1.00 ±0.01 V

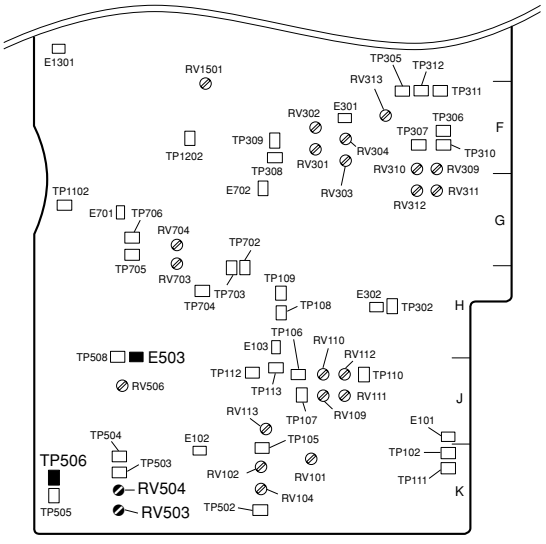
• 525 system



• 625 system



2. Eject the alignment tape.



DM-124 Board (Side A)

8-8-11. Playback Frequency Characteristic Adjustment

Equipment/Fixtures

- Analog component waveform monitor (for only a unit with BKJ-1) :
  TEKTRONIX WFM-300A or equivalent
- Serial component waveform monitor (for only a unit with BKJ-2) :
  TEKTRONIX WFM-600 or equivalent
- Analog composite video monitor

Note

This monitor is used to display the menu.

- Alignment tapes : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)
  CR5-2A PS (Part No. 8-960-098-44)
  CR5-2A (Part No. 8-960-097-44)

- 75 Ω terminators (3 pieces)

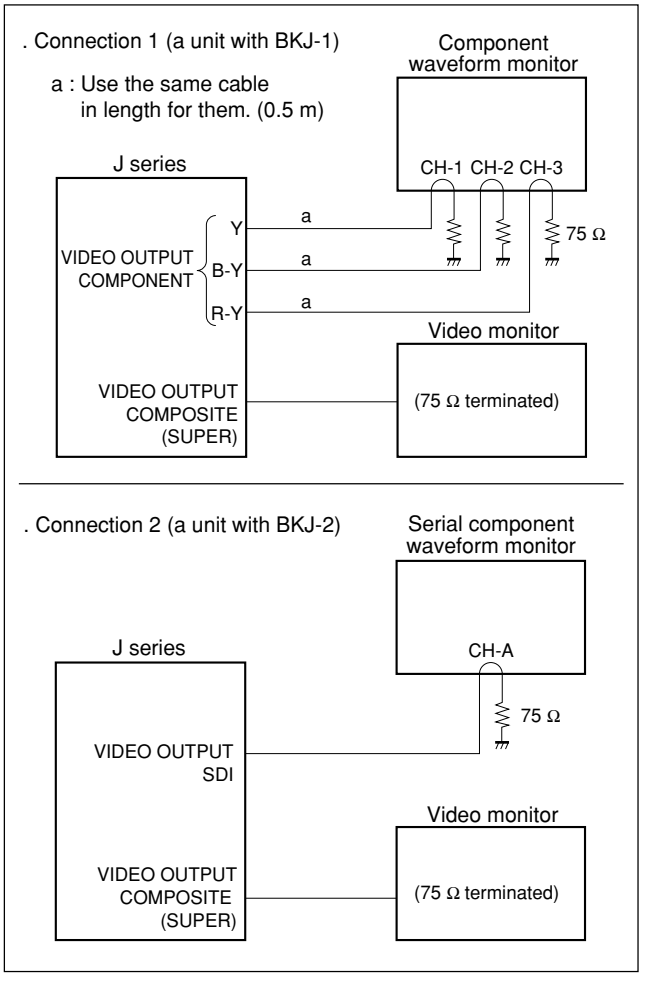
Preparation

1. Check of switch settings on DM-124 board

Set S1701 and S1801 to the factory-setting (OFF).

2. Connection of equipment

Connect the equipment as follows.



3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

1. Adjustment in 625 System

1. Maintenance mode start-up and initial data check

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A3 : BETACAM DM.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM DM

Perform step 4 only when the DM-124 board or NV-RAM (IC1805/DM-124 board) was replaced.

4. Check that the specified initial data are set in the following items.

Item (A3 : BETACAM DM)		Initial data
A31 : COS EQ VR (METAL-Y)		
	EQ1 METAL-Y-A	88
	EQ1 METAL-Y-B	88
A32 : COS EQ VR (METAL-C)		
	EQ1 METAL-C-A	75
	EQ1 METAL-C-B	75
A33 : COS EQ VR (OXIDE-Y)		
	EQ1 OXIDE-Y-A	89
	EQ1 OXIDE-Y-B	89
A34 : COS EQ VR (OXIDE-C)		
	EQ1 OXIDE-C-A	90
	EQ1 OXIDE-C-B	90

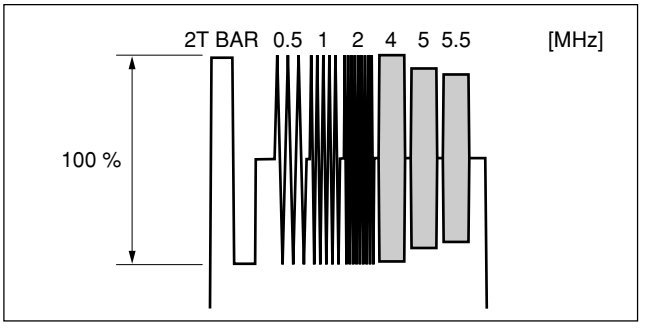
2. METAL Y adjustment (625)

1. Enter A31 : COS EQ VR (METAL-Y).
2. Observe the Y output signal on the waveform monitor.

Note

Signals of A and B channels are overlapped on the waveform monitor. Adjust and check each signal of A and B channels respectively.

3. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and measure the level at 2T BAR .
   Standardize it as a reference 100 % (0 dB).
4. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and adjust the level at 5 MHz with respect to the reference level.
   Adjusting locations : A ch : A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A
   B ch : A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-B
   Specification : 5 MHz : 91 % (96 to 87 %) {−0.8 ±0.4 dB}
5. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check the levels at the following frequencies.
   Specifications : 0.5 MHz : 100 % (106 to 63 %) {0 $^{+0.5}_{-4.0}$ dB}
   1 MHz : 100 % (106 to 63 %) {0 $^{+0.5}_{-4.0}$ dB}
   2 MHz : 100 % (106 to 63 %) {0 $^{+0.5}_{-4.0}$ dB}
   4 MHz : 100 % (106 to 63 %) {0 $^{+0.5}_{-4.0}$ dB}
   5 MHz : 71 % (106 to 63 %) {−3.0 $^{+2.0}_{-2.5}$ dB}



6. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check that the no flicker is observed in the played back picture on the video monitor.
7. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL-Y).
8. Stop the playback of the alignment tape.

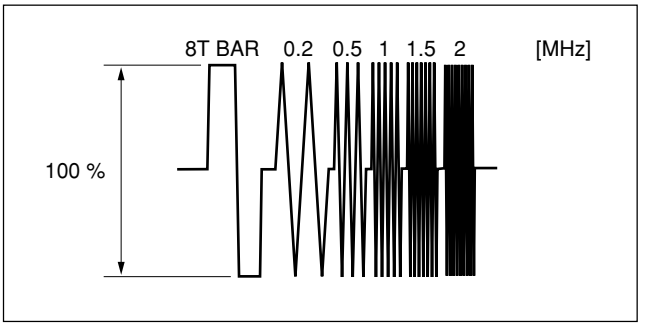
3. METAL C adjustment (625)

1. Enter A32 : COS EQ VR (METAL-C).
2. Observe the R-Y output signal on the waveform monitor.

   Note

   Signals of A and B channels are overlapped on the waveform monitor. Adjust and check each signal of A and B channels respectively.

3. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and measure the 8T BAR level.
   Standardize it as a reference 100 % (0 dB).
4. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and adjust the level at 1.5 MHz with respect to the reference level.
   Adjusting locations : A ch : A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A
   B ch : A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-B
   Specification : 1.5 MHz : 93 % (102 to 85 %) {−0.6 ±0.8 dB}
5. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check the levels at the following frequencies.
   Specifications : 0.2 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   0.5 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   1 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   2 MHz : 80 % (106 to 71 %) {$-2.0\ ^{+2.5}_{-1.0}$ dB}

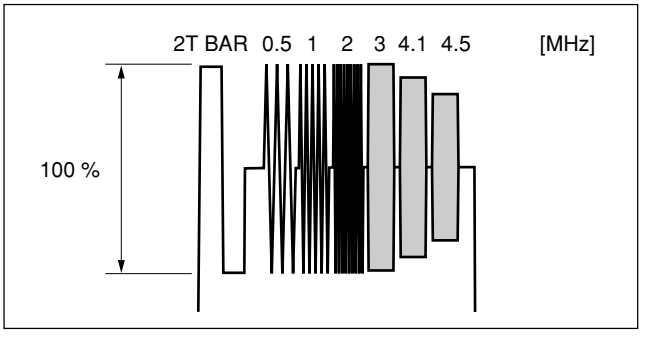


6. Observe the B-Y output signal on the waveform monitor.
7. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check that the B-Y output meets the specifications in above steps 4 and 5. If not met, fine-adjust so that both of R-Y and B-Y signals meet the above specifications.
8. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL-C).
9. Stop the playback of the alignment tape and eject it.

4. OXIDE Y Adjustment (625)

1. Enter A33 : COS EQ VR (OXIDE-Y).
2. Observe the Y output signal on the waveform monitor.
   Note
   Signals of A and B channels are overlapped on the waveform monitor. Adjust and check each signal of A and B channels respectively.

3. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and measure the 2T BAR level. Standardize it as a reference 100 % (0 dB).
4. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and adjust the level at 3 MHz with respect to the reference level.
   Adjusting locations : A ch : A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A
   B ch : A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-B
   Specification : 3 MHz : 89 % (100 to 79 %) {−1.0 +1.0 dB}
5. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and check the levels at the following frequencies.
   Specifications : 0.5 MHz : 100 % (106 to 50 %) {0 $^{+0.5}_{-6.0}$ dB}
   1 MHz : 100 % (106 to 50 %) {0 $^{+0.5}_{-6.0}$ dB}
   2 MHz : 100 % (106 to 50 %) {0 $^{+0.5}_{-6.0}$ dB}
   4.1 MHz : 71 % (106 to 50 %) {−3.0 $^{+3.5}_{-3.0}$ dB}



6. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and check that there is almost no difference between output levels of A and B channel signals at the high frequency portion (4.5 MHz).
   Note
   If there is any difference between output levels of A and B channel signals at the high frequency portion (4.5 MHz), adjust “SUB OXIDE-Y-A” or “SUB OXIDE-Y-B” in A33 : COS EQ VR (OXIDE).
   In this case, while playing back the multi-burst signal (3 : 00 to 6 : 00) of the alignment tape CR5-2A PS, adjust the channel of low level, performing the following steps (1) and (2).
   (1) By changing data of “SUB OXIDE-Y-A” (A ch signal side), judge which channel is low.
   (2) If B ch signal level is low, set data of “SUB OXIDE-Y-A” back to the original value and increase the data of “SUB OXIDE-Y-B” (B ch signal side) to eliminate the difference from the level of A ch signal.
   If A B ch signal level is low, increase the data of “SUB OXIDE-Y-A” (A ch signal) to eliminate the difference.

7. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE-Y).
8. Stop the playback of the alignment tape.

5. OXIDE C adjustment (625)

1. Enter A33 : COS EQ VR (OXIDE-C).
2. Observe the R-Y output signal on the waveform monitor.

   Note

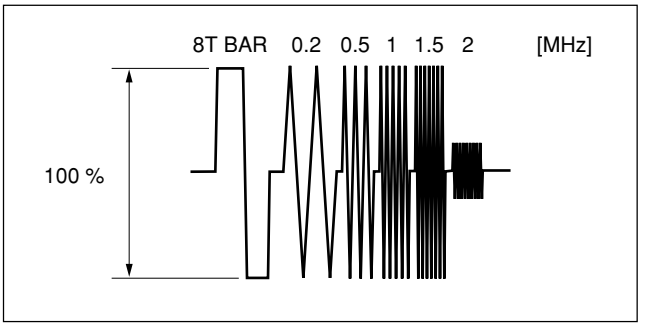
   Signals of A and B channels are overlapped on the waveform monitor. Adjust and check each signal of A and B channels respectively.

3. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and measure the 8T BAR level. Standardize it as a reference 100 % (0 dB).
4. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and adjust the level at 1 MHz to meet the specification with respect to the reference level.

   Adjusting locations : A ch : A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A
   B ch : A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-B

   Specification : 1 MHz : 94 % (102 to 86 %) {−0.5 ±0.8 dB)
5. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and check the levels at the following frequencies.

   Specifications : 0.2 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   0.5 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   1.5 MHz : 84 % (106 to 71 %) {$-1.5\ ^{+2.0}_{-1.5}$ dB}



6. Observe the B-Y output signal on the waveform monitor.
7. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A PS and check that the B-Y output meets the specifications in above steps 4 and 5. If not met, fine-adjust so that both of R-Y and B-Y signals meet the above specifications.
8. Press the MENU (SHIFT + SET) button once to exit A34 : COS EQ VR (OXIDE-C).
9. Stop the playback of the alignment tape and eject it.

6. Data save (save of 625 system adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute “SAVE ALL ADJUST DATA”.
   • When the data save finishes properly, “ Save Complete” appears on the video monitor.
2. Terminate the maintenance mode.

2. Adjustment in 525 System

1. Preparation

1. Change the unit to 525 system.

2. Maintenance mode start-up and initial data check

1. Start up the maintenance mode.
2. Enter A3 : BETACAM DM.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM DM

Perform step 3 only when the DM-124 board or NV-RAM (IC1805/DM-124 board) was replaced.

3. Check that the specified initial data are set in the following items.

Item (A3 : BETACAM DM)		Initial data
A31 : COS EQ VR (METAL)		
	EQ1 METAL-Y-A	86
	EQ1 METAL-Y-B	86
	EQ1 METAL-C-A	6D
	EQ1 METAL-C-B	6D
A33 : COS EQ VR (OXIDE)		
	EQ1 OXIDE-Y-A	8A
	EQ1 OXIDE-Y-B	8A
	EQ1 OXIDE-C-A	80
	EQ1 OXIDE-C-B	80

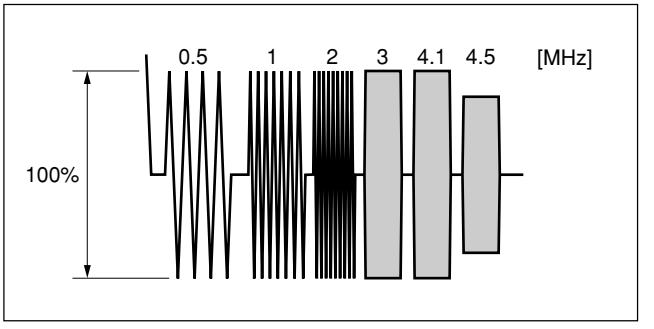
3. METAL Y adjustment (525)

1. Enter A31 : COS EQ VR (METAL).
2. Observe the Y output signal on the waveform monitor.

Note

Signals of A and B channels are overlapped on the waveform monitor. Adjust and check each signal of A and B channels respectively.

3. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B and measure the level at 0.5 MHz.
   Standardize it as a reference 100 % (0 dB).
4. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B and adjust the level at 4.1 MHz with respect to the reference level.
   Adjusting locations : A ch : A31 : COS EQ VR (METAL) : EQ1 METAL-Y-A
   B ch : A31 : COS EQ VR (METAL) : EQ1 METAL-Y-B
   Specification : 4.1 MHz : 94 % (100 to 90%) {$-0.5\ ^{+0.5}_{-0.4}$ dB}
5. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B and check the levels at the following frequencies.
   Specifications : 1 MHz : 100 % (106 to 63 %) {$0\ ^{+0.5}_{-4.0}$ dB}
   2 MHz : 100 % (106 to 63 %) {$0\ ^{+0.5}_{-4.0}$ dB}
   3 MHz : 100 % (106 to 63 %) {$0\ ^{+0.5}_{-4.0}$ dB}
   4.5 MHz : 80 % (106 to 63 %) {$-2.0\ ^{+2.5}_{-2.0}$ dB}



6. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B and check that the no flicker is observed in the played back picture on the video monitor.
7. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL).
8. Stop the playback of the alignment tape.

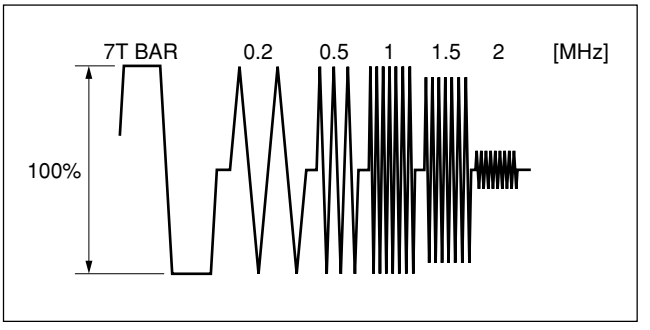
4. METAL C adjustment (525)

1. Enter A31 : COS EQ VR (METAL).
2. Observe the R-Y output signal on the waveform monitor.

   Note

   Signals of A and B channels are overlapped on the waveform monitor. Adjust and check each signal of A and B channels respectively.

3. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B and measure the 7T BAR level.
   Standardize it as a reference 100 % (0 dB).
4. While playing back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B, adjust the level at 1 MHz with respect to the reference level.
   Adjusting locations : A ch : A31 : COS EQ VR (METAL) : EQ1 METAL-C-A
   B ch : A31 : COS EQ VR (METAL) : EQ1 METAL-C-B
   Specification : 1 MHz : 94 % (100 to 89 %) {−0.5 ±0.5 dB}
5. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B and check the levels at the following frequencies.
   Specifications : 0.2 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   0.5 MHz : 100 % (106 to 71 %) {$0\ ^{+0.5}_{-3.0}$ dB}
   1.5 MHz : 80 % (106 to 71 %) {$-2.0\ ^{+2.5}_{-1.0}$ dB}

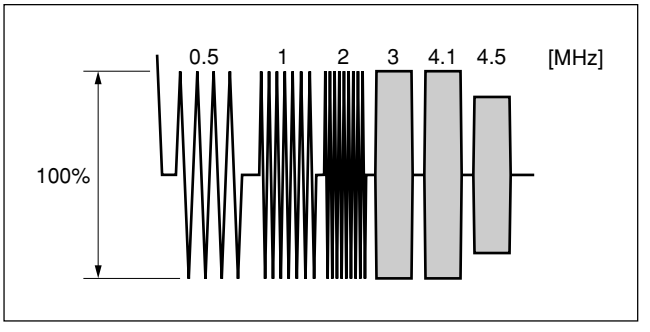


6. Observe the B-Y output signal on the waveform monitor.
7. Play back the multi-burst signal (08 : 00 to 11 : 00) of the alignment tape CR5-1B PS and check that the B-Y output meets the specifications in above steps 4 and 6. If not met, fine-adjust so that both of R-Y and B-Y signals meet the above specifications.
8. Press the MENU (SHIFT + SET) button once to exit A31 : COS EQ VR (METAL).
9. Stop the playback of the alignment tape and eject it.

5. OXIDE Y adjustment (525)

1. Enter A33 : COS EQ VR (OXIDE).
2. Observe the Y output signal on the waveform monitor.
   Note
   Signals of A and B channels are overlapped on the waveform monitor. Adjust and check each signal of A and B channels respectively.

3. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A and measure the level at 0.5 MHz. Standardize it as a reference 100% (0 dB).
4. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A and adjust the level at 2 MHz with respect to the reference level.
   Adjusting locations : A ch : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-A
   B ch : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-Y-B
   Specification : 2 MHz : 100 % (104 to 95%) {0 $^{+0.3}_{-0.4}$ dB}
5. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A and check the levels at the following frequencies.
   Specifications : 1 MHz : 100 % (106 to 50 %) {0 $^{+0.5}_{-6.0}$ dB}
   3 MHz : 89 % (106 to 50 %) {−1.0 $^{+1.5}_{-5.0}$ dB}
   4.1 MHz : 71 % (106 to 50 %) {−3.0 $^{+3.5}_{-3.0}$ dB}



6. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A and check that there is almost no difference between output levels of A and B channel signals at the high frequency portion (4.5 MHz).
   Note
   If there is any difference between output levels of A and B channel signals at the high frequency portion (4.5 MHz), adjust “SUB OXIDE-Y-A” or “SUB OXIDE-Y-B” in A33 : COS EQ VR (OXIDE). In this case, while playing back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A, adjust the channel of low level, performing the following steps (1) and (2).
   (1) By changing data of “SUB OXIDE-Y-A” (A ch signal), judge which channel is low.
   (2) If B ch signal level is low, set data of “”SUB OXIDE-Y-A” back to the original data and increase the data of “SUB OXIDE-Y-B” (B ch signal) to eliminate the difference from the level of A ch signal.
   If A ch signal level is low, increase the data of “SUB OXIDE-Y-A” (A ch signal) to eliminate the difference.

7. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE).
8. Stop the playback of the alignment tape.

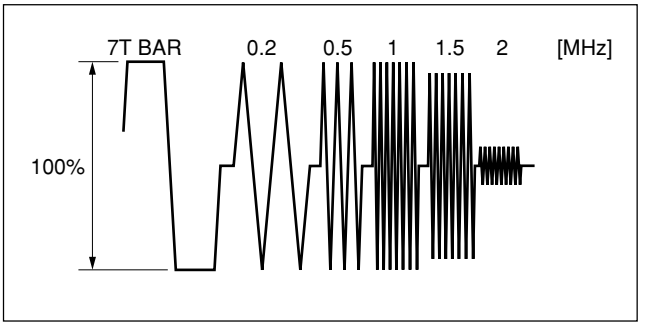
6. OXIDE C adjustment (525)

1. Enter A33 : COS EQ VR (OXIDE).
2. Observe the R-Y output signal on the waveform monitor.

   Note

   Signals of A and B channels are overlapped on the waveform monitor. Adjust and check each signal of A and B channels respectively.

3. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A and measure the 7T BAR level. Standardize it as a reference 100 % (0 dB).
4. While playing back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A, adjust the level at 1 MHz with respect to the reference level.
   Adjusting locations : A ch : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-A
   B ch : A33 : COS EQ VR (OXIDE) : EQ1 OXIDE-C-B
   Specification : 1 MHz : 94 % (100 to 89%) {−0.5 ±0.5 dB}
5. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A and check the levels at the following frequencies.
   Specifications : 0.2 MHz : 100 % (106 to 71 %) {0 $^{+0.5}_{-3.0}$ dB}
   0.5 MHz : 95 % (106 to 71 %) {−0.4 $^{+0.9}_{-2.6}$ dB}
   1.5 MHz : 80 % (106 to 71 %) {−2.0 $^{+2.5}_{-1.0}$ dB}



6. Observe the B-Y output signal on the waveform monitor.
7. Play back the multi-burst signal (03 : 00 to 06 : 00) of the alignment tape CR5-2A and check that the B-Y output meets the specifications in above steps 4 and 5. If not met, fine-adjust so that both of R-Y and B-Y signals meet the above specifications.
8. Press the MENU (SHIFT + SET) button once to exit A33 : COS EQ VR (OXIDE).
9. Stop the playback of the alignment tape and eject it.

7. Data save (save of 525 system adjusted data)

1. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.
2. Terminate the maintenance mode.

8-8-12. Drop-out Compensation Equalizer Adjustment

Equipments/Fixtures

- Oscilloscope :
  TEKTRONIX TDS460A or equivalent
- Alignment tape : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-94)

Preparation

1. Check of switch settings on DM-124 board

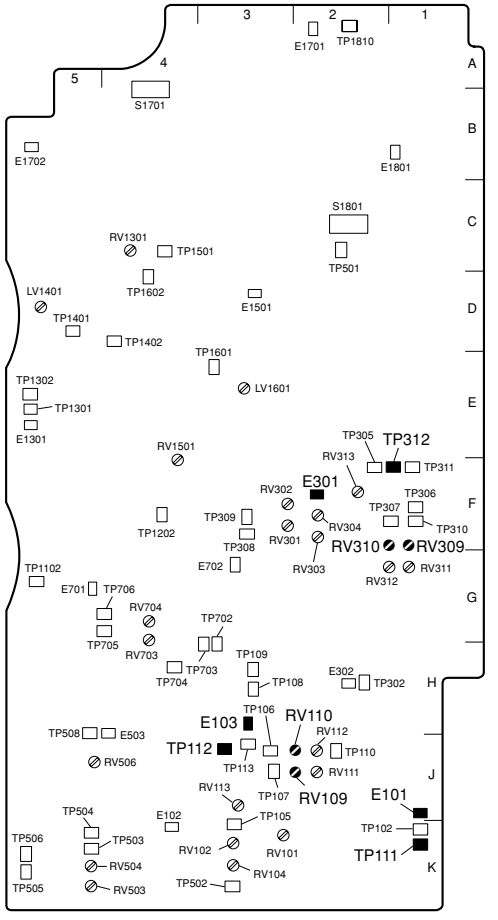
Set S1701 and S1801on the DM-124 board to the factory-setting (OFF).

2. Change of video system

Change the unit to the mainly used video system.

3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

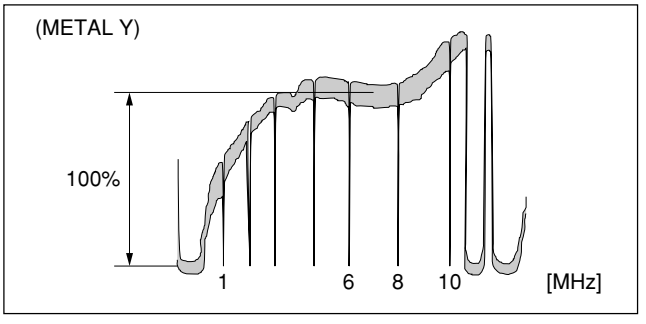


DM-124 Board (Side A)

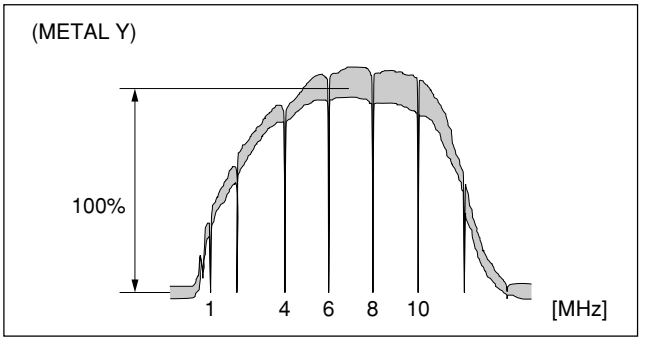
1. METAL Y Adjustment

1. Connect and set the oscilloscope as follows.
   CH-1: TP112/DM-124 (J-3), DC 200 mV/DIV
   GND : E101/DM-124 (J-1)
   CH-2: TP111/DM-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME: 2 ms/DIV
   TRIG: CH-2, − slope
2. Play back the RF sweep signal (00 : 00 to 02 : 00) of the following alignment tape and measure the level at 6 MHz.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
   Standardize the measured level as a reference 100 % (0 dB).
3. Play back the RF sweep signal (00 : 00 to 02 : 00) of the following alignment tape and adjust the levels at 8 MHz and 10 MHz.
   • 625 system : CR5-1B
   • 525 system : CR5-1B PS
   Adjusting location : ⊘RV109/DM-124 (J-2)
   Specifications : 8 MHz : 100 ± 20 % (0 ± 2.0 dB)
   10 MHz :
   525 system : 120 $^{+50}_{-20}$ %
   (2.0 $^{+5.0}_{-2.0}$ dB)
   625 system : 110 $^{+40}_{-20}$ %
   (1.0 $^{+4.0}_{-2.0}$ dB)

• 525 system



• 625 system

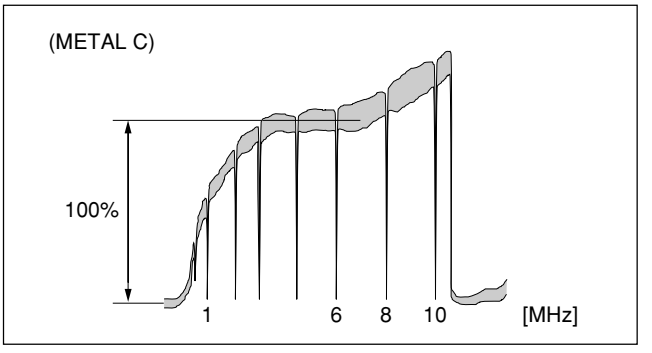


4. Stop the playback of the alignment tape.

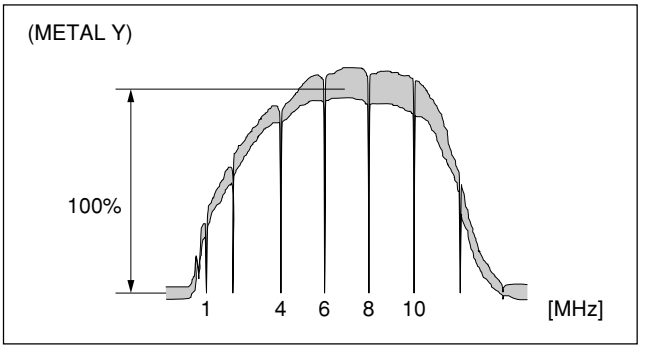
2. METAL C Adjustment

1. Change the connection of the oscilloscope as follows.
   CH-1: TP312/DM-124 (F-1)
   GND : E301/DM-124 (F-2)
   CH-2: TP111/DM-124 (K-1)
   GND : E103/DM-124 (H-3)
2. Play back the RF sweep signal (00 : 00 to 02 : 00) of the following alignment tape and measure the level at 6 MHz.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
   Standardize the measured level as a reference 100 % (0 dB).
3. Play back the RF sweep signal (00 : 00 to 02 : 00) of the following alignment tape and adjust the levels at 8 MHz and 10 MHz.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
   Adjusting location : ◐RV309/DM-124 (F-1)
   Specifications : 8 MHz: 100 ± 20 %
   (0 ± 2.0 dB)
   10 MHz : 110 $^{+40}_{-20}$ %
   (1.0 $^{+4.0}_{-2.0}$ dB)

• 525 system



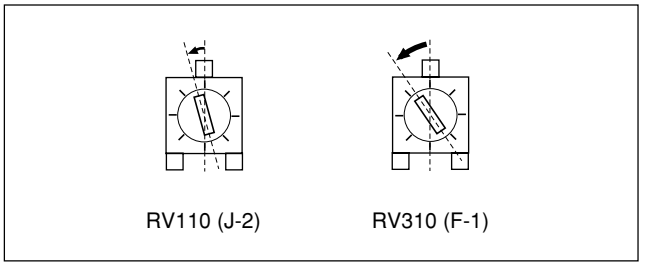
• 625 system



4. Eject the alignment tape.

3. OXIDE Y/C Adjustment

Set the components on the DM-124 board as shown below.



8-8-13. DM RF Output Level Re-adjustment

Re-adjust the DM RF output level in the same procedure as in Section 8-8-6.

Note

To continue “8-8-14. RF Envelope Adjustment”, it not necessary to eject the alignment tape.

8-8-14. RF Envelope Adjustment

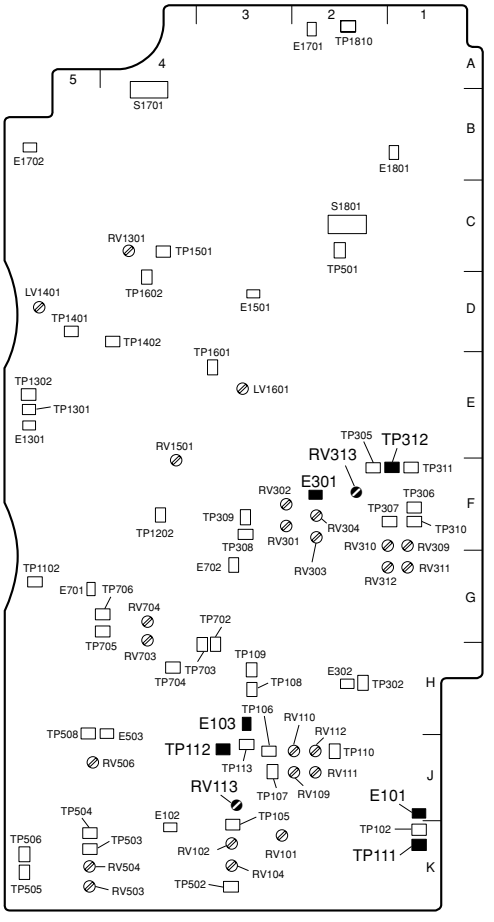
Equipment/Fixtures

- Oscilloscope :
  TEKTRONIX TDS460A or equivalent
- Analog composite video monitor

Note

This monitor is used to display the menu.
Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.

- Alignment tape : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)



DM-124 Board (Side A)

Preparation

1. Check of switch settings on DM-124 board

Set S1701 and S1801 to the factory-setting (OFF).

2. Change of video system

Change the unit to the mainly used video system.

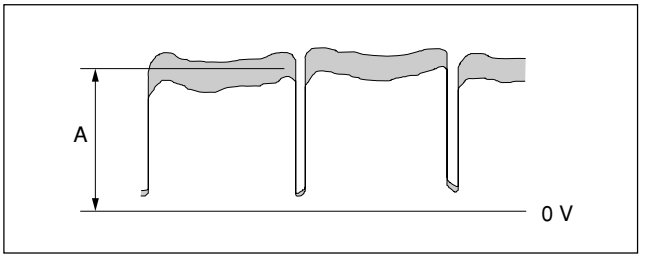
3. Warming-up

Before starting the adjustment, warm up the unit and oscilloscope through the power for 20 minutes or more.

1. Y Adjustment

1. Connect and set the oscilloscope as follows.
   CH-1 : TP112/DM-124 (J-3), DC 500 mV/DIV
   GND : E101/DM-124 (J-1)
   CH-2 : TP111/DM-124 (K-1), DC 1 V/DIV
   GND : E103/DM-124 (H-3)
   TIME : 5 ms/DIV
   TRIG : CH-1, − slope
2. Play back the flat field signal (24 : 00 to 26 : 00) of the following alignment tape and adjust.
   - 525 system : CR5-1B
   - 625 system : CR5-1B PS

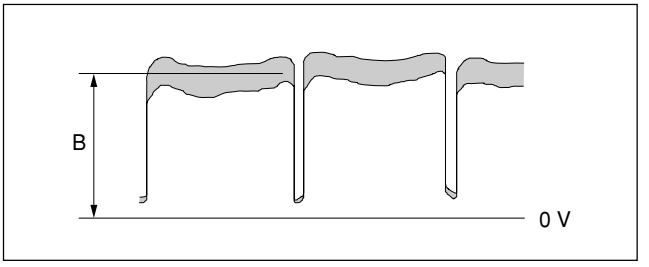
   Adjusting location : ⊘RV113/DM-124 (J-3)
   Specification : A = 2.0 ±0.2 V dc



3. Stop the playback of the alignment tape.

2. C Adjustment

1. Change only the CH-1 connection of the oscilloscope as follows.
   CH1 : TP312/DM-124 (F-1)
   GND : E301/DM-124 (F-2)
   (Keep the setting and CH-2 connection unchanged.)
2. Play back the flat field signal (24 : 00 to 26 : 00) of the following alignment tape and adjust.
   • 525 system : CR5-1B
   • 625 system : CR5-1B PS
   Adjusting location : ⊘RV313/DM-124 (F-2)
   Specification : B = 2.0 ±0.2 V dc



3. Stop the playback of the alignment tape.
4. In case of the 525 system, eject the alignment tape.
   Note
   To continue "8-8-15. Search Picture Voltage Adjustment" in the 625 system, it is not necessary to eject the alignment tape.

3. Threshold Level Setting (Check) (Perform in the 625 system.)

Note

This adjustment uses the menu exclusive for 625 system. Even if the unit is mainly used in the 525 video system, change the unit to the 625 system to perform this check.

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A36 : DO TH/ENV TH VR.
   Maintenance Mode → M1 : ADJUST → A3 : BETACAM DM → A36 : DO TH/ENV TH VR
4. Check that the specified data are set in the following items below.

Item (A36 : DO TH/ENV TH VR)	Setting data
ENV-TH-A	20
ENV-TH-B	20

5. Press the MENU (SHIFT + SET) button once to exit A36 : DO TH/ENV TH VR.

Data save (save of adjusted data)

Perform step 6 only when data is changed in step 4.

6. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

7. Terminate the maintenance mode.

8-8-15. Search Picture Voltage Adjustment (Perform in 625 system.)

Note

This adjustment uses the menu exclusive for 625 system. Even if the unit is mainly used in 525 video system, change the unit to the 625 system and check.

Equipment/Fixtures

- Digital voltmeter :
  ADVANTEST TR6845 or equivalent
- Alignment tape : CR5-1B PS (Part No. 8-960-096-91)
- Shorting clip

Preparation

1. Check of switch settings on DM-124 board

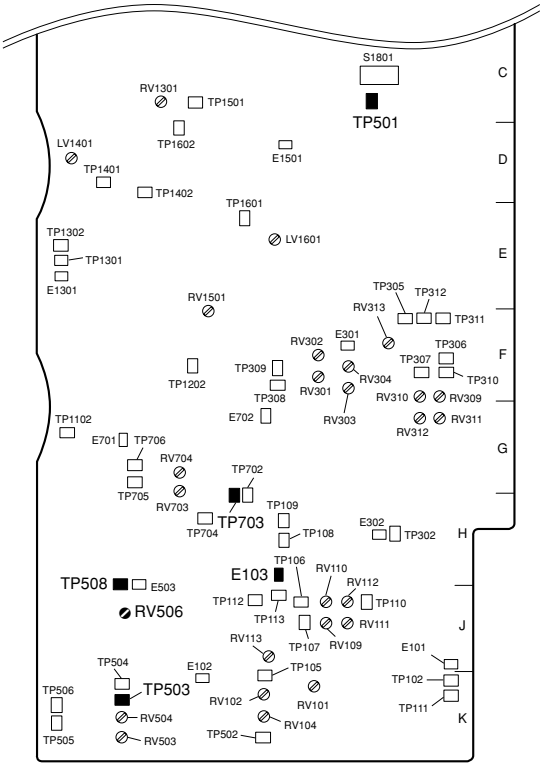
Set S1801 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Change of video system

Change the unit to the 625 system.

3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.



DM-124 Board (Side A)

Voltage Adjustment

1. Start up the maintenance mode.
2. Enter A38 : DEMO BAL/ETC. VR.
   Maintenance Mode → M1 : ADJUST → A3 : BETA-CAM DM → A38 : DEMO BAL/ETC. VR
3. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS and measure DC voltage levels at locations below with a digital voltmeter. (Fill out the list below.)

Measuring location	Measured value (Fill in the blanks)
TP508/DM-124 (H-5)	_____
TP503/DM-124 (K-5)	_____
TP703/DM-124 (H-3)	_____

4. Stop the playback of the alignment tape.
5. Turn fully clockwise RV506/DM-124 (J-5).
6. Short between TP501/DM-124 (C-2) and E103/DM-124 (H-3) with a shorting clip.
7. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS and adjust DC voltage levels at locations below to meet the levels measured in step 1.

Measuring location	Adjusting location (A38 : DEMO BAL/ETC. VR)
TP508/DM-124 (H-5)	SV TAPE SPEED OFFSET
TP503/DM-124 (K-5)	VAR DEEMP-Y
TP703/DM-124 (H-3)	VAR DEEMP-C

8. Stop the playback of the alignment tape.
9. Remove the shorting clip from TP501/DM-124 (C-2) and E103/DM-124 (H-3).
10. Press the MENU (SHIFT + SET) button once to exit A38 : DEMO BAL ETC. VR.
11. Enter A3F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
    - When the data save finishes properly, "Save Complete" appears on the video monitor.
12. Terminate the maintenance mode.
13. Eject the alignment tape.

8-8-16. Search Picture Gain Adjustment

Equipment/Fixtures

- Oscilloscope :
  TEKTRONIX TDS460A or equivalent
- Alignment tape : CR5-1B (Part No. 8-960-096-41)
  CR5-1B PS (Part No. 8-960-096-91)

Preparation

1. Check of switch settings on DM-124 board

Set S1701 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Change of video system

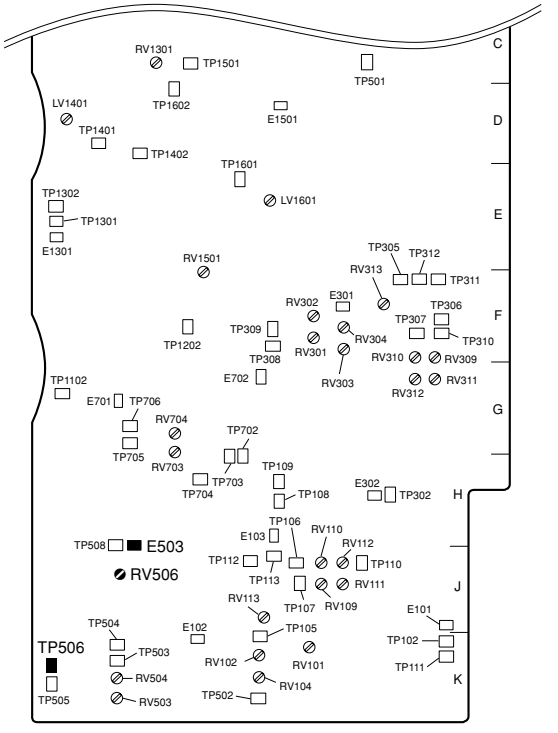
Change the unit to the mainly used video system.

3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

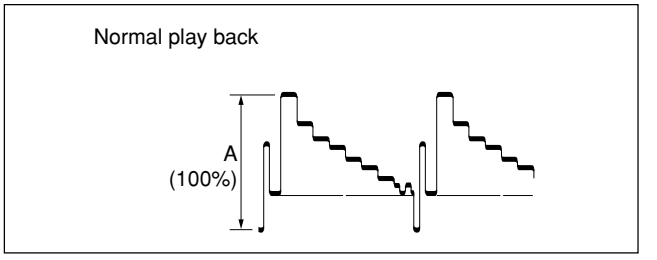
Gain Adjustment

1. Connect and set the oscilloscope as follows.
   CH-1 : TP506/DM-124 (K-5), DC 1 V/DIV
   GND : E503/DM-124 (H-4)
   TIME : 10 µs/DIV



DM-124 Board (Side A)

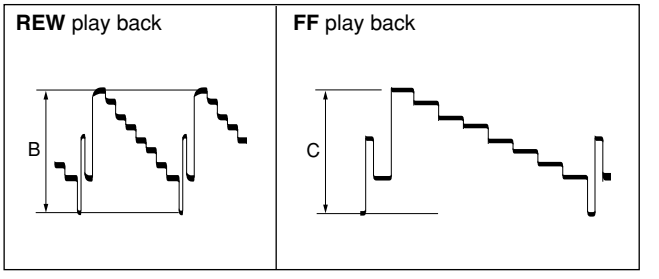
2. Play back the color bars signal (14 : 00 to 17 : 00) of the following alignment tape in PLAY mode and measure the level A. Standardize the level A as a reference level 100 % (0 dB).
   - 525 system : CR5-1B
   - 625 system : CR5-1B PS



3. Play back the color bars signal (14 : 00 to 17 : 00) of the alignment tape in the modes below, and adjust and check.

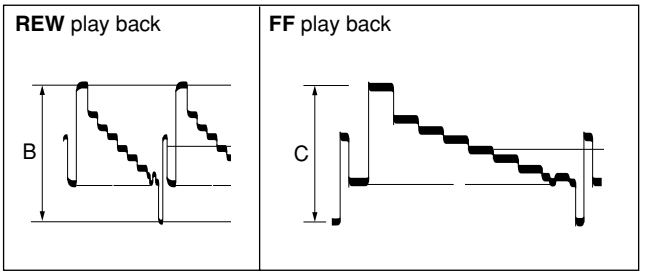
   - 625 system

Play back mode	Specification	Adjusting location
REW	B = 100 ±10 % (0 ±1.0 %)	⊘RV506/ DM-124 (J-5)
FF	C = 105 ±5 % (0.4 ±0.4 %)	Check only



   - 525 system

Play back mode	Specification	Adjusting location
REW	B = 100 ±3 % (0 ±0.2 dB)	⊘RV506/ DM-124 (J-5)
FF	C = 100 ±10 % (0 ±1.0 dB)	Check only



4. Eject the alignment tape.

8-8-17. Component Output Level Adjustment

Equipment/Fixtures

- Analog component waveform monitor (for J-1/901, J-2/901, and J-3/901) :
  TEKTRONIX WFM-300A or equivalent
- Serial component waveform monitor (for J-1/902, J-2/902, and J-3/902) :
  TEKTRONIX WFM-600 or equivalent
- Analog composite video monitor

Note

This monitor is used to display the menu. Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.

- Alignment tapes : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)
  CR5-2A PS (Part No. 8-960-098-44)
  CR5-2A (Part No. 8-960-097-44)
- 75 Ω terminators (3 pieces)

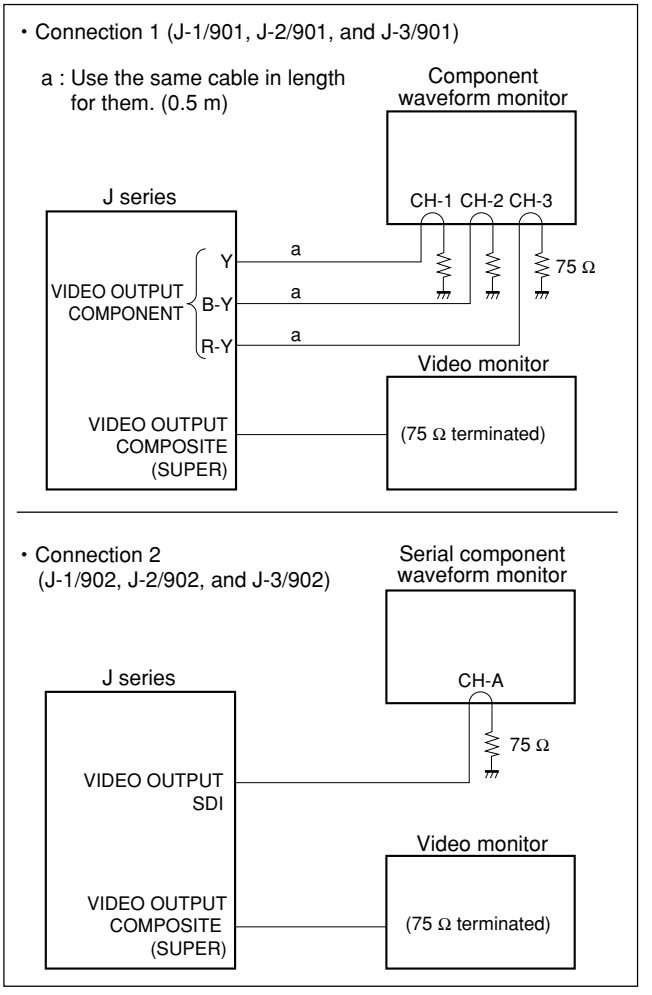
Preparation

1. Check of switch settings on DM-124 board

Set S1701 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Connection of equipment

Connect the equipment as follows.



3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

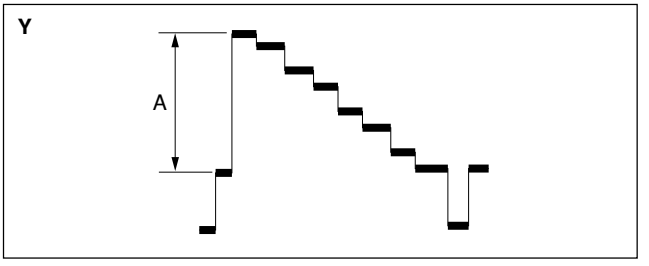
1. Adjustment in 625 System

1. Maintenance mode start-up

1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A41 : LVL/PHASE VR.
   Maintenance Mode → M1 : ADJUST → A4 : BETACAM TBC → A41 : LVL/PHASE VR

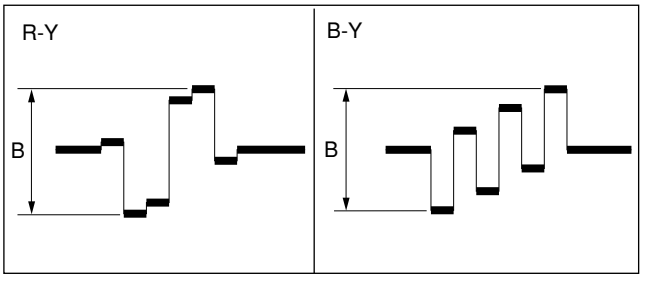
2. METAL Y/C check (625)
(METAL Y)

1. Observe the Y output signal on the component waveform monitor.
2. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS and check the white level. If not met the specification, adjust.
   Adjusting location : A41 : LVL/PHASE VR : AD LEVEL METAL-Y
   Specification : A = 700 ±7 mV



(METAL C)

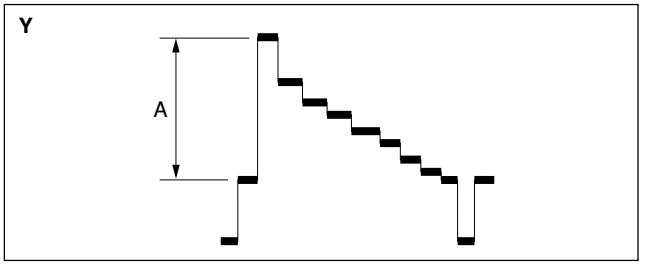
3. Observe both of R-Y and B-Y signals on the component waveform monitor.
4. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS and check the levels of R-Y and B-Y signals. If not met the specification, adjust.
   Adjusting location : A41 : LVL/PHASE VR : AD LEVEL METAL-C
   Specification : B = 700 ±7 mV p-p



5. Stop the playback of the alignment tape and eject it. (SET → EJECT → METAL)

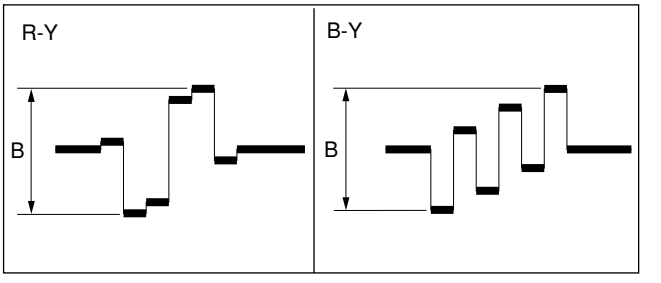
3. OXIDE Y/C check (625)
(OXIDE Y)

1. Observe the Y output signal on the component waveform monitor.
2. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape CR5-2A PS and check the white level. If not met the specification, adjust.
   Adjusting location : A41 : LVL/PHASE VR : AD LEVEL OXIDE-Y
   Specification : A = 700 ±7 mV



(OXIDE C)

3. Observe both of R-Y and B-Y signals on the component waveform monitor.
4. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape CR5-2A PS and check the levels of R-Y and B-Y signals. If not met the specification, adjust.
   Adjusting location : A41 : LVL/PHASE VR : AD LEVEL OXIDE-C
   Specification : B = 525 ±5 mV p-p



5. Press the MENU (SHIFT + SET) button once to exit A41 : LVL/PHASE VR.
6. Eject the alignment tape.

4. Data save (save of 625 system adjusted data)

1. Enter A4F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

2. Adjustment in 525 System

1. Preparation

1. Change the unit to the 525 system.
2. Check the setting of the setup expanded menu.
   ITEM-713 : VIDEO SETUP REFERENCE LEVEL
   → 0.0 %

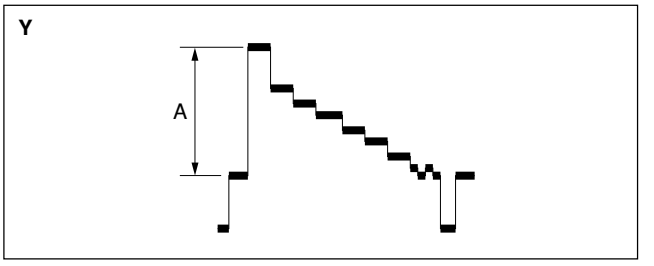
2. Maintenance mode start-up

1. Start up the maintenance mode.
3. Enter A41 : LVL/PHASE VR.
   Maintenance Mode → M1 : ADJUST → A4 : BETACAM TBC → A41 : LVL/PHASE VR

2. METAL Y/C check (525)

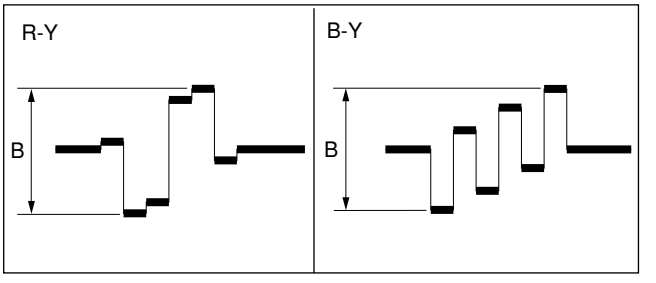
(METAL Y)

1. Observe the Y output signal on the component waveform monitor.
2. Play back the 75 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B and check the white level. If not met the specification, adjust.
   Adjusting location : A41 : LVL/PHASE VR : AD LEVEL METAL-Y
   Specification : A = 714 ±7 mV (100 ±1 IRE)



(METAL C)

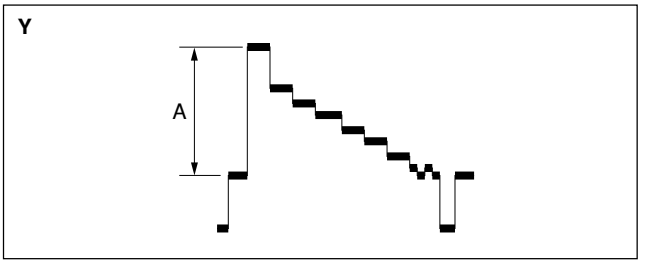
3. Observe both of R-Y and B-Y signals on the component waveform monitor.
4. Play back the 75 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B and check the levels of R-Y and B-Y signals. If not met the specification, adjust.
   Adjusting location : A41 : LVL/PHASE VR : AD LEVEL METAL-C
   Specification : B = 700 ±7 mV p-p



5. Stop the playback of the alignment tape and eject it. (SET → EJECT → METAL)

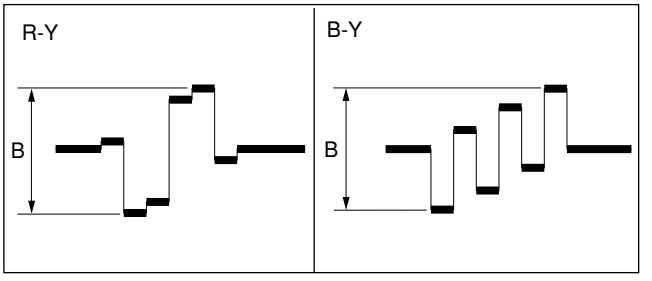
4. OXIDE Y/C check (525)
(OXIDE Y)

1. Observe the Y output signal on the component waveform monitor.
2. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape CR5-2A and check the white level. If not met the specification, adjust.
   Adjusting location : A41 : LVL/PHASE VR : AD LEVEL OXIDE-Y
   Specification : A = 714 ± 7 mV (100 ± 1 IRE)



(OXIDE C)

3. Observe both of R-Y and B-Y signals on the component waveform monitor.
4. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape CR5-2A and check the levels of R-Y and B-Y signals. If not met the specification, adjust.
   Adjusting location : A41 : LVL/PHASE VR : AD LEVEL OXIDE-C
   Specification : B = 700 ± 7 mV p-p



5. Press the MENU (SHIFT + SET) button once to exit A41 : LVL/PHASE VR.
6. Eject the alignment tape.

5. Data save (save of 525 system adjusted data)

1. Enter A4F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

8-8-18. VCO Lock Range Adjustment

Equipment/Fixture

- Oscilloscope :
  TEKTRONIX TDS460A or equivalent
- Alignment tape : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)

Preparation

1. Change of video system

Change the unit to the mainly used video system.

2. Warming-up

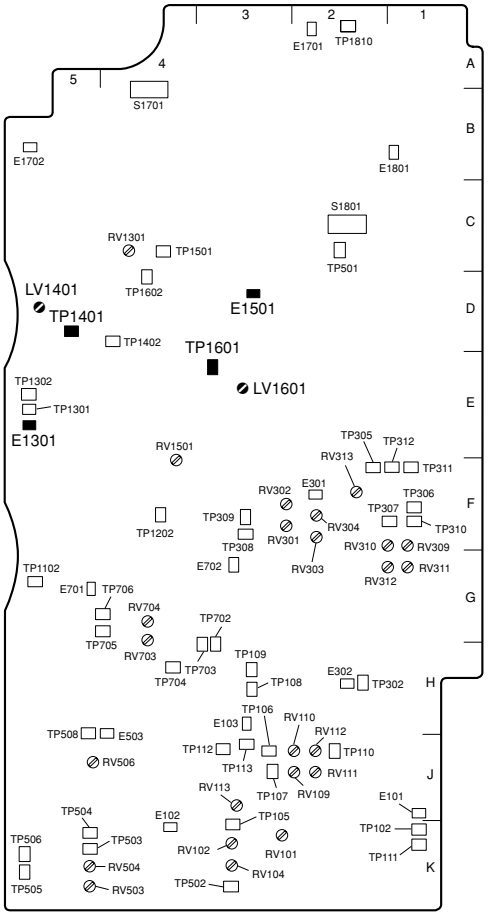
Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

Adjustment

1. Connect and set the oscilloscope as follows.
   CH-1 : TP1401/DM-124 (D-5), DC 1 V/DIV
   GND : E1301/DM-124 (E-5)
   CH-2 : TP1601/DM-124 (E-3), DC 1 V/DIV
   GND : E1501/DM-124 (D-3)
2. Play back the color bars signal (14 : 00 to 17 : 00) of the following alignment tape.
   - 525 system : CR5-1B
   - 625 system : CR5-1B PS
3. Adjust DC levels of Y and C channels respectively.
   Adjusting locations : Y (CH-1) : ⊘LV1401/DM-124 (D-5)
   C (CH-2) : ⊘LV1601/DM-124 (E-3)
   Specification : 2.3 ±0.2 V dc
4. Stop the playback of the alignment tape.

   Note

   To continue “8-8-19. TBC VCO Free-run Adjustment”, it is not necessary to eject the alignment tape.



DM-124 Board (Side A)

8-8-19. TBC VCO Free-run Adjustment

Note

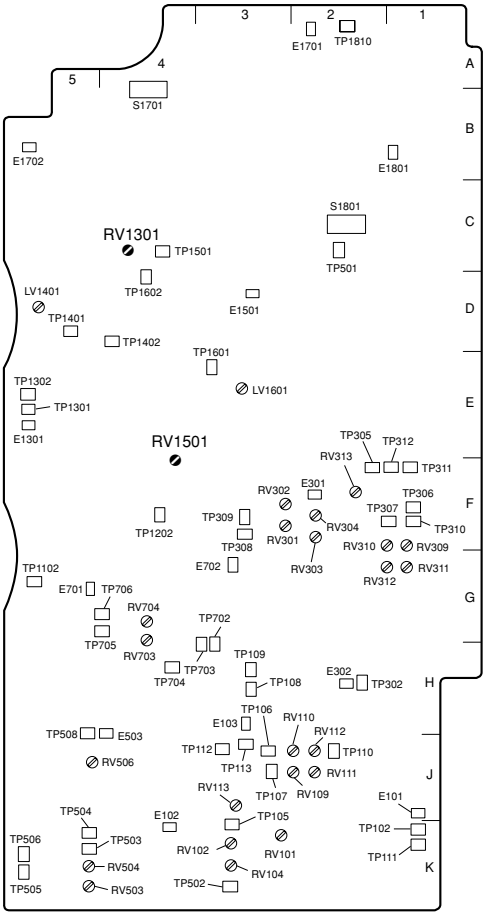
Perform this adjustment only when RV1301 on the DM-124 board was replaced or inadvertently touched. After this adjustment, perform Section 8-8-20 and later.

Equipment/Fixture

- Analog composite video monitor

  Note

  Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.
- Alignment tape : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)



DM-124 Board (Side A)

Preparation

1. Check of switch settings on DM-124 board

Set S1701 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Change of video system

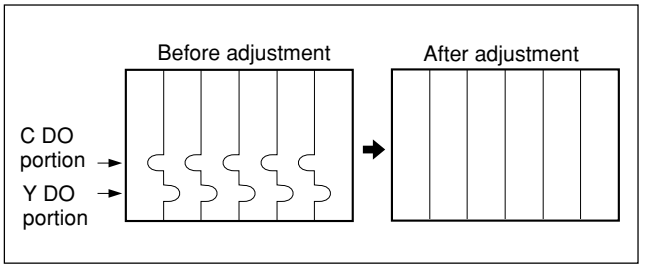
Change the unit to the mainly used video system.

3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

Adjustment

1. Play back the color bars signal (containing drop-out) (26 : 00 to 28 : 00) of the following alignment tape in VARIABLE mode (1 time normal speed).
   - 525 system : CR5-1B
   - 625 system : CR5-1B PS
2. Check that the drop-out does not appear in the specified portion (C DO and Y DO) on the video monitor. If the drop-out appears, adjust.
   Adjusting locations : Y DO : ⊘RV1301/DM-124 (C-4)
   C DO : ⊘RV1501/DM-124 (F-4)
   Specification : No drop-out is observed in the specified portion (C DO and Y DO).



3. Stop the playback the of alignment tape.

   Note

   To continue “8-8-20. FAST VCO Tracking Adjustment”, it is not necessary to eject the alignment tape.

8-8-20. FAST VCO Tracking Adjustment (Perform in 625 system.)

Note

This adjustment uses the menu exclusive for 625 system. Even if the unit is mainly used in 525 system, change the unit to the 625 system and perform the adjustment.

Equipment/Fixture

- Analog composite video monitor

  Note

  Connect it to the VIDEO OUTPUT COMPOSITE (SUPER) connector on the connector panel.
- Alignment tapes : CR5-1B PS (Part No. 8-960-096-91)
  CR5-2A PS (Part No. 8-960-098-44)

Preparation

1. Check of switch settings on DM-124 board

Set S1701 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Change of video system

Change the unit to the 625 video system.

3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

Adjustment

1. Start up the maintenance mode.
2. Enter A42 : YC DL/Y TR VR.
   Maintenance Mode → M1 : ADJUST → A4 : BETACAM TBC → A42 : YC DL/Y TR VR
3. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS in REW and FF modes. Check that the color bars appear on the video monitor.
4. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS at 24 times normal speed in SHUTTLE mode. Check that the vertical lines of the color bars are stable on the video monitor.
   If the vertical lines of the color bars are disturbed, adjust.
   Adjusting location : A42 : YC DL/Y TR VR : Y TR VR OFFSET
   Specification : Minimize the disturbance of the color bars vertical lines.
5. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS at variable speed (−10X to + Maximum) in SHUTTLE mode. Check that the vertical lines of the color bars are stable on the video monitor.
   If the vertical lines of the color bars are disturbed, adjust.
   Adjusting location : A42 : YC DL/Y TR VR : Y TR OFFSET
   Specification : Minimize the disturbance of the color bars vertical lines.
6. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL/Y TR OFFSET.
7. Eject the alignment tape.

Perform step 8 only when the value of “Y TR OFFSET” is changed in step 4 or 5.

8. Enter A4F : NV-RAM CONTROL, and execute “SAVE ALL ADJUST DATA”.
   - When the data save finishes properly, “Save Complete” appears on the video monitor.

9. Terminate the maintenance mode.
10. Play back the 75 % color bars signal (00 : 00 to 03 : 00) of the alignment tape CR5-2A PS in REW and FF modes. Check that the color bars appear on the video monitor.
11. Eject the alignment tape.

8-8-21. Playback Video Phase Adjustment

Equipment/Fixtures

- Analog composite waveform/vector monitor :
  TEKTRONIX 1750A, 1780R or equivalent
- Analog composite video monitor

Note

This monitor is used to display the menu. Connect it to the VIDEO COMPOSITE (SUPER) connector on the connector panel.

- Alignment tape : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)
- 75 Ω terminator

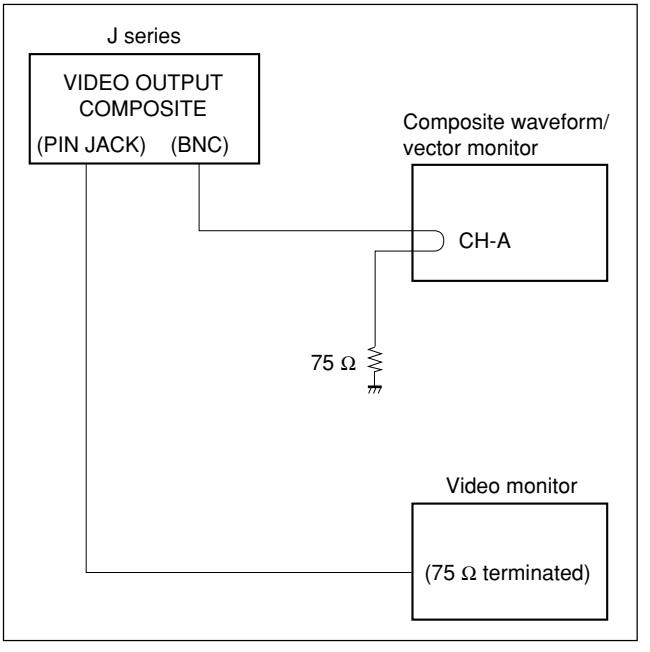
Preparation

1. Check of switch setting on DM-124 board.

Set S1701 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Connection of equipment

Connect the equipment.



3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

1. Adjustment in 625 System

1. Maintenance mode start-up and initial data check

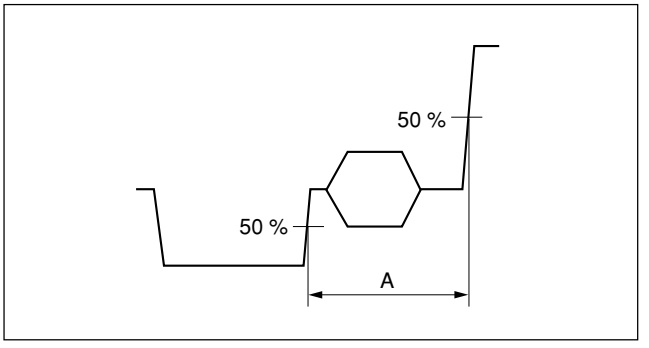
1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A40 : TBC IC DATA.
   Maintenance Mode → M1 : ADJUST → A4 : BETA-CAM TBC → A40 : TBC IC DATA

Perform step 4 only when the DM-124 board or NV-RAM (IC1805/DM-124 board) was replaced.

4. Check that the initial data “45” is set in “SQ-Y RZ” of A40 : TBC IC DATA.
5. Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.

2. Y phase adjustment (625)

1. Set the analog composite waveform/vector monitor as follows.
   WAVEFORM mode, SWEEP : 2H, MAG ON, INPUT : CH-A, INT REF
2. Display the burst signal of CH-A on the composite waveform/vector monitor.
3. Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS.
4. Adjust the time A to meet the specification.
   Time A : Duration between 50 % position of leading edge of the H SYNC and 50 % position of leading edge of the white signal.
   Adjusting location : A41 : LVL/PHASE VR : VIDEO PH
   Specification : A = 5.2 ±0.1 µs
   If not met the specification, re-adjust after performing the following steps (1) to (7).



But, perform steps (1) to (7) only when the adjustment in step 4 fails.

(1) Press the MENU (SHIFT + SET) button once to exit A41 : LVL/PHASE VR.
(2) Enter A40 : TBC IC DATA.
(3) Play back the 100 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B PS.
(4) Increment or decrement data in “SQ-Y RZ”. (+1 or −1)
(5) Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.
(6) Enter A41 : LVL/PHASE VR.
(7) Perform step 4 again.

5. Press the MENU (SHIFT + SET) button once to exit A41 : LVL/PHASE VR.
6. Stop the playback of the alignment tape and eject it.

3. Data save (save of 625 system adjusted data)

1. Enter A4F : NV-RAM CONTROL, and execute “SAVE ALL ADJUST DATA”.
   • When the data save finishes properly, “Save Complete” appears on the video monitor.

2. Terminate the maintenance mode.

2. Adjustment in 525 System

1. Preparation for adjustment

1. Change the unit to the 525 system.
2. Check the setting of the setup expanded menu.
   ITEM-713 : VIDEO SETUP REFERENCE LEVEL
   → 0.0 %

2. Maintenance mode start-up and initial data check

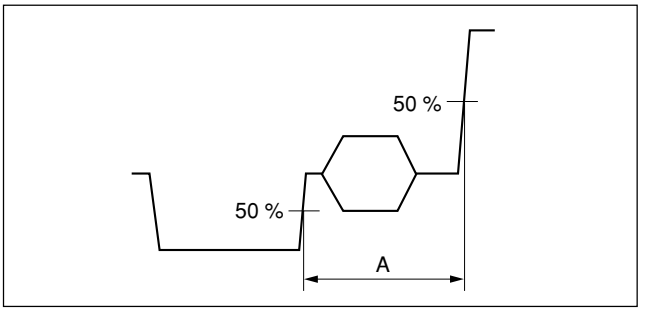
1. Start up the maintenance mode.
2. Enter A40 : TBC IC DATA.
   Maintenance Mode → M1 : ADJUST → A4 : BETACAM TBC → A40 : TBC IC DATA

Perform step 3 only when the DM-124 board or NV-RAM (IC1805/DM-124 board) was replaced.

3. Check that the initial data "46" is set in "SQ-Y RZ" of A40 : TBC IC DATA.
4. Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.

3. Y phase adjustment (525)

1. Set the analog composite waveform/vector monitor as follows.
   WAVEFORM mode, SWEEP : 2H, MAG ON,
   INPUT : CH-A, INT REF
2. Display the burst signal of CH-A on the composite waveform/vector monitor.
3. Play back the 75 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B.
4. Adjust the time A to meet the specification.
   Time A : Duration between 50 % position of leading edge of the H SYNC and 50 % position of leading edge of the white signal.
   Adjusting location : A41 : LVL/PHASE VR : VIDEO PH
   Specification : A = 5.2 ±0.1 µs
   If not met the specification, re-adjust after performing the following steps (1) to (7).



But, perform steps (1) to (7) only when the adjustment in step 4 fails.

(1) Press the MENU (SHIFT + SET) button once to exit A41 : LVL/PHASE VR.
(2) Enter A40 : TBC IC DATA.
(3) Play back the 75 % color bars signal (14 : 00 to 17 : 00) of the alignment tape CR5-1B.
(4) Increment or decrement data in "SQ-Y RZ". (+1 or −1)
(5) Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.
(6) Enter A41 : LVL/PHASE VR.
(7) Perform step 4 again.

5. Press the MENU (SHIFT + SET) button once to exit A41 : LVL/PHASE VR.
6. Stop the playback of the alignment tape and eject it.

4. Data save (save of 525 system adjusted data)

1. Enter A4F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

8-8-22. TBC Y/C Delay Adjustment

Equipment/Fixtures

- Analog composite waveform monitor (for J-1/901, J-2/901, and J-3/901) :
  TEKTRONIX WFM-300A or equivalent
- Serial component waveform monitor (for J-1/902, J-2/902, and J-3/902) :
  TEKTRONIX WFM-600 or equivalent
- Analog composite video monitor

Note

This monitor is used to display the menu. Connect it to the VIDEO COMPOSITE (SUPER) connector on the connector panel.

- Alignment tape : CR5-1B PS (Part No. 8-960-096-91)
  CR5-1B (Part No. 8-960-096-41)
- 75 Ω terminators (3 pieces)

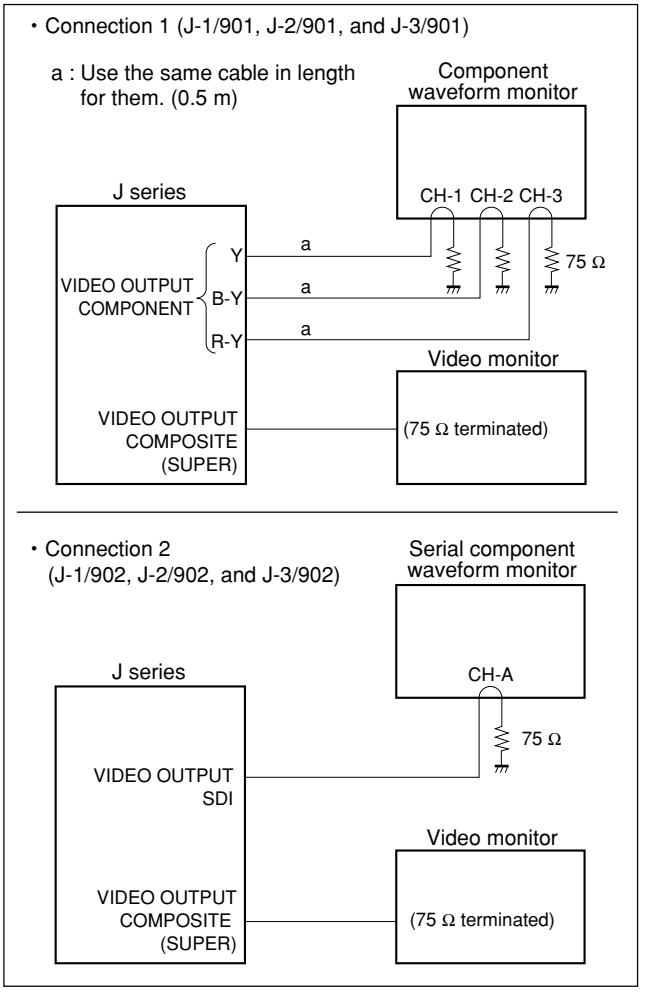
Preparation

1. Check of switch settings on DM-124 board.

Set S1701 and S1801 on the DM-124 board to the factory-setting (OFF).

2. Connection of equipment

Connect the equipment as follows.



3. Warming-up

Before starting the adjustment, warm up the unit and equipment through the power for 20 minutes or more.

1. Adjustment in 625 System

1. Maintenance mode start-up and initial data check

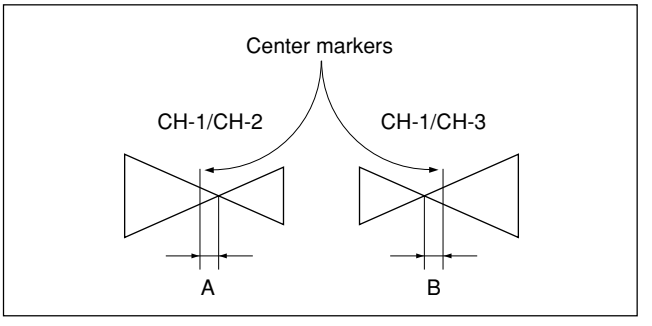
1. Change the unit to the 625 system.
2. Start up the maintenance mode.
3. Enter A40 : TBC IC DATA.
   Maintenance Mode → M1 : ADJUST → A4 : BETACAM TBC → A40 : TBC IC DATA

Perform step 4 only when the DM-124 board or NV-RAM (IC1805/DM-124 board) was replaced.

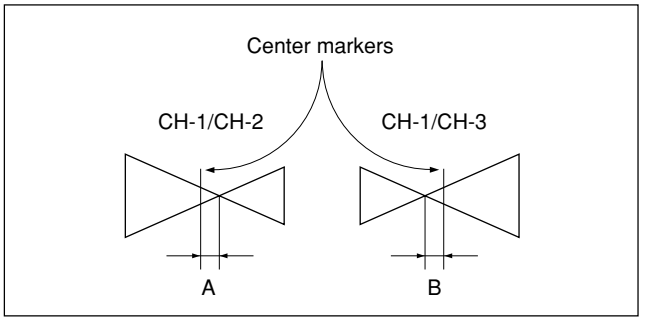
4. Check that the initial data "40" is set in "SQ-C RZ" of A40 : TBC IC DATA.
5. Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.

2. METAL adjustment (625)

1. Set the component waveform monitor to the BOWTIE mode.
2. Enter A42 : YC DL/Y TR VR.
3. Play back the BOWTIE signal (17 : 00 to 19 : 00) of the alignment tape CR5-1B PS.
4. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the differences between bowtie dip points and the center markers meet the specifications.
   Adjusting locations : Field 1 : A42 : YC DL/Y TR VR : Y/C DELAY M-A
   Field 2 : A42 : YC DL/Y TR VR : Y/C DELAY M-B
   Specifications : A = 0 ±10 ns
   B = 0 ±10 ns



5. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the difference between bowtie dip points and the center markers meets the specification.
   Adjusting location : ◕RV1501/DM-124 (F-4)
   Specification : A − B = 0 ±10 ns



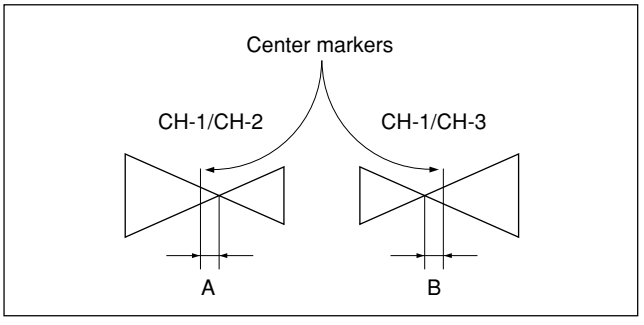
If not met the specification, re-adjust after performing the following steps (1) to (7).
But, perform only when the adjustments in steps 4 and 5 fail.

(1) Press the MENU (SHIFT + SET) button once to exit A42 : YC DL/Y TR VR.
(2) Enter A40 : TBC IC DATA.
(3) Play back the BOWTIE signal (17 : 00 to 19 : 00) of the alignment tape CR5-1B PS.
(4) Increment or decrement data (+2 or −2) in "SQ-C RZ" of A40 : TBC IC DATA so that the cross points of CH-1 (Y)/CH-2(B-Y) and CH-1 (Y)/CH-3 (R-Y) approaches the center markers.
(5) Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.
(6) Enter A42 : YC DL/Y TR VR.
(7) Perform steps 4 and 5 again.

6. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL/Y TR VR.
7. Stop the playback of the alignment tape and eject (SET → EJECT → MENU).

3. OXIDE adjustment (625)

1. Play back the BOWTIE signal (06 : 00 to 09 : 00) of the alignment tape CR5-2A PS.
2. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the differences between bowtie dip points and the center markers meet the specifications.
   Adjusting locations : Field 1 : A42 : YC DL/Y TR VR : Y/C DELAY O-A
   Field 2 : A42 : YC DL/Y TR VR : Y/C DELAY O-B
   Specifications : A = 0 ±10 ns
   B = 0 ±10 ns



3. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL/Y TR VR.
4. Eject the alignment tape.

4. Data save (save of 625 system adjusted data)

1. Enter A4F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

2. Adjustment in 525 System

1. Preparation

1. Change the unit to the 525 system.
2. Check the setting of the setup expanded menu.
   ITEM-713 : VIDEO SETUP REFERENCE LEVEL → 0.0 %

2. Maintenance mode start-up and initial data check

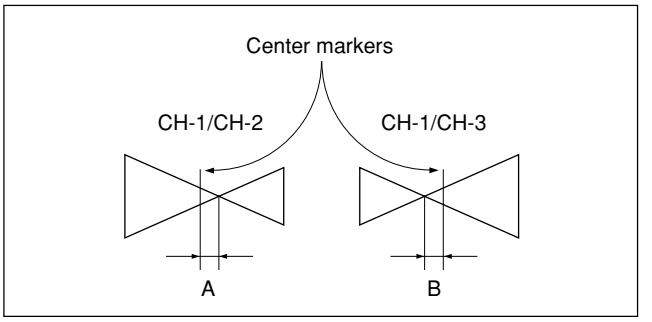
1. Start up the maintenance mode.
2. Enter A40 : TBC IC DATA.
   Maintenance Mode → M1 : ADJUST → A4 : BETACAM TBC → A40 : TBC IC DATA

Perform step 3 only when the DM-124 board or NV-RAM (IC1805/DM-124 board) was replaced.

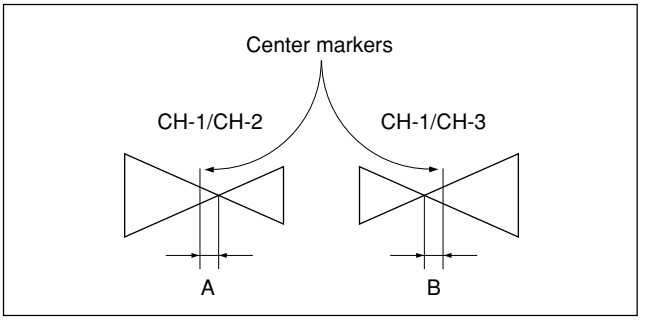
3. Check that the initial data "4D" is set in "SQ-C RZ" of A40 : TBC IC DATA.
4. Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.

3. METAL adjustment (525)

1. Set the component waveform monitor to the BOWTIE mode.
2. Enter A42 : YC DL VR.
3. Play back the BOWTIE signal (17 : 00 to 19 : 00) of the alignment tape CR5-1B.
4. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the differences between bowtie dip points and the center markers meet the specifications.
   Adjusting locations : Field 1 : A42 : YC DL VR : Y/C DELAY M-A
   Field 2 : A42 : YC DL VR : Y/C DELAY M-B
   Specifications : A = 0 ±10 ns, B = 0 ±10 ns



5. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the difference between bowtie dip points and the center markers meets the specification.
   Adjusting location : ⊘RV1501/DM-124 (F-4)
   Specification : A − B = 0 ± 10 ns



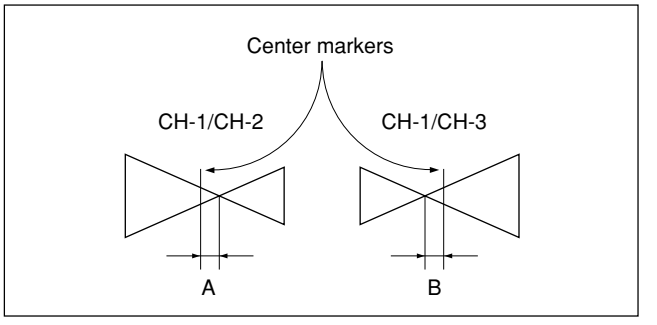
If not met the specification, re-adjust after performing the following steps (1) to (7).
But, perform only when the adjustments in steps 4 and 5 fail.

(1) Press the MENU (SHIFT + SET) button once to exit A42 : YC DL VR.
(2) Select A40 : TBC IC DATA.
(3) Play back the BOWTIE signal (17 : 00 to 19 : 00) of the alignment tape CR5-1B.
(4) Increment or decrement data (+2 or −2) in "SQ-C RZ" of A40 : TBC IC DATA so that the cross points of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y) approaches the center markers.
(5) Press the MENU (SHIFT + SET) button once to exit A40 : TBC IC DATA.
(6) Select A42 : YC DL VR.
(7) Perform steps 4 and 5 again.

6. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL VR.
7. Stop the playback of the alignment tape and eject (SET → EJECT → MENU).

4. OXIDE Adjustment (525)

1. Play back the BOWTIE signal (06 : 00 to 09 : 00) of the alignment tape CR5-2A.
2. Observe the cross-points (BOWTIE DIP points) of CH-1 (Y)/CH-2 (B-Y) and CH-1 (Y)/CH-3 (R-Y), and adjust the following locations so that the differences between bowtie dip points and the center markers meet the specifications.
   Adjusting locations : Field 1 : A42 : YC DL VR : Y/C DELAY O-A
   Field 2 : A42 : YC DL VR : Y/C DELAY O-B
   Specifications : A = 0 ± 10 ns
   B = 0 ± 10 ns



3. Press the MENU (SHIFT + SET) button once to exit A42 : YC DL VR.
4. Eject the alignment tape.

5. Data save (save of 525 system adjusted data)

1. Enter A4F : NV-RAM CONTROL, and execute "SAVE ALL ADJUST DATA".
   • When the data save finishes properly, "Save Complete" appears on the video monitor.

2. Terminate the maintenance mode.

8-9. Tele-File Adjustment (CCM-48 Board)

Perform this adjustment when the CCM-48 board is replaced or repaired.

Note

For details on each menu in the maintenance mode, refer to Section 3.

Equipment/Fixtures

- Oscilloscope : TEKTRONIX TDS460A or equivalent
  Note
  Use a probe of input capacitance 10.8 to 27.0 pF
- Adjusting driver : Ceramic driver

Adjustment

Note

To adjust precisely, keep the followings in mind.
- Remove the cassette tape from the unit.
- Keep away unnecessary items (especially metallic objects) from the CCM-48 board.

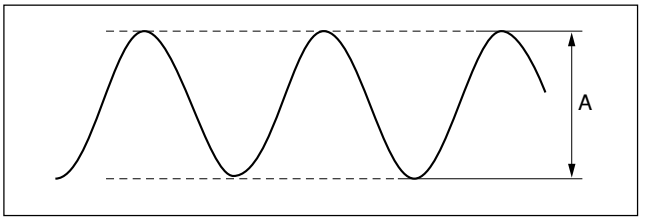
1. Turn off the power switch.
2. Remove the front panel assembly. (Refer to Section 1-4-1.) But, do not remove the flat cables.
3. Connect the oscilloscope and set it as follows.
   Note
   Do not touch the probe's GND to the CCM-48 board. If done so, the CCM-48 board will be destroyed.

   CH-1 : TP1/CCM-48 (A-2), DC 5 V/DIV
   GND : Chassis plate
   CH-2 : TP2/CCM-48 (A-2), DC 5 V/DIV
   GND : Chassis plate
   MODE : CH-2 INVERT, ADD, 20 MHz BW LIMIT = OFF
   TIME : 20 ns/DIV
   TRIG : CH-1, DC, LEVEL = 12 V

4. Turn on the power switch and start up the maintenance mode.
   Note
   As the front panel assembly is not firmly fixed, do not apply force to the flat cables.

5. Enter A8 : Tele-File ADJUST.
   Maintenance Mode → M1 : ADJUST → A8 : Tele-File ADJUST

6. Check the waveform on the oscilloscope and adjust with the adjusting driver (ceramic driver).
   Adjusting location : ⊘CT1/CCM-48 board (A-2)
   Specification : A = Maximum
   (Sine wave of over 15 Vp-p)



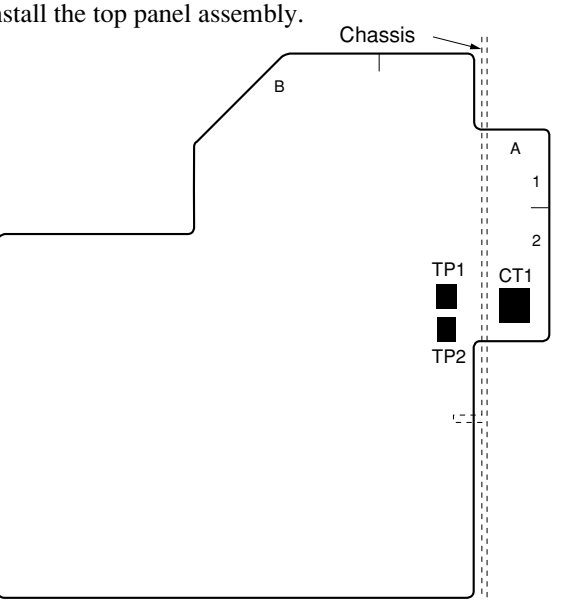
7. Terminate the maintenance mode and turn off the unit.
8. Remove the probe of the oscilloscope from the CCM-48 board.

Check after Adjustment

1. Attach the front panel assembly to the unit. Do not tighten the screws.
2. Turn on the power switch and insert the cassette tape with the memory label. Check that reading/writing of the Tele-File data works properly.
   If it does not work, change the specification as shown below and adjust again.

(1) Turn clockwise (↻) CT1 to the point where the level is dropped by 10 % from the maximum.
(2) If it still does not work, turn counterclockwise (↺) CT1 to the point where the level is dropped by 10 % from the maximum.

3. After the adjustment is completed, tighten the screws to fix the front panel assembly.
4. Install the top panel assembly.



CCM-48 Board (Side B)

Section 9
Circuit Outline

9-1. Circuit Outline

9-1-1. RF System

1. Playback System (MB-919 Board, Drum Assembly)

The playback RF outputs from the respective PB heads that are located in the upper drum, are sent to the respective playback amplifiers in the lower drum assembly. Only the output of playback amplifier outputs that are enabled by the head control timing signal supplied from the MB-919 board, are sent to the MB-919 board.
In the case of playing back the Betacam SX tape, the RF signals of the maximum two channels are sent to the MB-919 board. These RF signals are passed through the amplifier in the equalize block and the equalizer circuit, and is A/D converted. The A/D converted signal is sent to the Inner ECC Decode block as the playback data.
In the Inner ECC Decode block, the playback data receives the viterbi decoding and inner error correction.
The playback data after the error correction is sent to the DPR-172/174 board.
In the case of playing back the analog Betacam tape, the RF signals (Y, C) of two channels are sent to the DM-124 board.

9-1-2. Digital Signal Processing System

1. Betacam SX Playback System (MB-919 Board, DPR-172/174 Board)

The Betacam SX playback data is sent to the Outer ECC Decoder block on the DPR-172 board via the Inner ECC Decoder block on the MB-919 board.
In the Inner ECC Decode block, the inner error correction is applied to audio data and to the video data respectively.
In the Outer ECC Decode block, the outer error correction is applied to the audio data and to the video data respectively.
The video data after error correction is sent to the SX BRR (Bit Rate Reduction) Decode block and the audio data after error correction is sent to the Audio Process block respectively.
In the SX BRR Decode block, the playback video data is returned to the 8-bit digital video signal. This signal is sent to the IF-808/826 board as the Betacam SX playback video signal.

2. MPEG IMX Playback System (MB-919 Board, DPR-174 Board)

The MPEG IMX playback data is sent to the Outer ECC Decode block on the DPR-174 board via the Inner ECC Decode block on the MB-919 board.
In the Inner ECC Decode block, the inner error correction is applied to the audio data and the video data respectively.
In the Outer ECC Decode block, the outer error correction is applied to the audio data and the video data respectively.
The video data after error correction is converted to the MPEG format using the MFC (MPEG Format Converter).
The video data is sent to the IMX BRR (Bit Rate Reduction) Decode block and the audio data after error correction is sent to the Audio Process block respectively.
In the BRR Decode block, the playback video data is decoded to the 8-bit digital video signal.
This signal is sent to the IF-808/826 board as the MPEG IMX playback video signal.

3. Digital Betacam Playback System (MB-919 Board, DPR-174 Board)

The Digital Betacam playback data is sent to the Outer ECC Decode block on the DPR-174 board via the Inner ECC Decode block on the MB-919 board.
In the Inner ECC Decode block, the inner error correction is applied to the audio data and the video data respectively.
In the Outer ECC Decode block, the outer error correction is applied to the audio data and the video data respectively.
The video data after error correction is sent to the DB BRR (Bit Rate Reduction) Decode block. The audio data after error correction is sent to the Audio Process block.
In the BRR Decode block, the playback video data is decoded to the 10-bit digital video signal.
This signal is sent to the IF-808/826 board as the Digital Betacam playback video signal.

9-1-3. Analog Betacam Playback System

1. Video System (DM-124 Board)

The RF signals (Y, C) that are supplied from the respective PB heads of the upper drum assembly are passed through the COS EQ circuit, and is FM-demodulated, receives the non-linear de-emphasis processing, and is passed through the noise canceller circuit, A/D-converted and receives the delay processing to match the delay timing.
The video signal that is delayed to match the timing then receives the time base correction, search picture processing and CTDM expansion processing at the Video Data Process block together with the line memory based on the various timing pulses.
The clock signal for the memory control and the various timing pulses are generated from the sync signal that is extracted from the video signal.
The Y and C (R-Y/B-Y) signals that are read out from the line memory are sent to the MPX block after the Y signal only receives the NR (Noise Reduce) processing and the C (R-Y/B-Y) signal only receives the line-crawl cancel processing.
The Y/R-Y/B-Y signals that are input to the MPX block are converted to the D1 format, passed through the Setup Remove block and are sent to the IF-808/826 board as the analog Betacam playback video signal.
In the Setup Remove block, the processing to remove the setup is performed only the NTSC (525 mode.)
In the DM-124 board, the DO (Drop Out) detection is also performed.

2. Audio System

Refer to section “9-1-5. Audio Signal Processing System.”

9-1-4. Video Signal Processing System

1. Playback System

The video playback signal (Digital format) is restored in the DPR-172/174 board and is output through the IF-808/826 board.
The analog Betacam video playback signal is restored in the DM-124 board and is output through the IF-808/826 board.

2. Signal Output System (IF-808/826 Board)

When the playback video signal is input to the Video Encode block, the playback input video signal is converted to the component signal data and the composite encoded data by the encode block, and is output as the analog video output signal. When the 525 mode is selected, the setup processing is performed in the Video Encode block.
Such output data as described above is D/A-converted and is output from the respective VIDEO OUTPUT connectors on the connector panel as the analog component signal (IF-808 board only), the S VIDEO signal and the analog composite signal.
The character data can be superimposed* on the analog composite output signal. (Two video systems at BNC connector and RCA pin-jack.) The character data cannot be superimposed on the analog component output signal (IF-808 board only) and on the S VIDEO output signal.
From the IF-826 board, the input playback video signal is output to the SDI Encode block as the SDI output signal still in the form of the digital component signal.
The digital component video signal for the SDI output is multiplexed with the audio signal and is converted from parallel-to-serial data at the SDI Encode block and is output from the SDI OUTPUT (SUPER) connector on the connector panel as the SDI output signal.
The character data can be superimposed* on the SDI output signal.

∗ : In the IF-826 board, the character data that is superimposed on the VIDEO OUTPUT COMPOSITE (SUPER) and on the SDI OUTPUT is the same signal.

3. Sync System (IF-808/826 Board, MB-919 Board)

The internal reference signals of the video/audio signals are generated by the MB-919 board.
The external reference video signal that is input to the EXT SYNC connector on the connector panel is sent to the Timing Gen. block of the IF-808/826 board.
In the Timing Gen. block, sync signals are separated from the input reference video signal.
In the Timing Gen. block of the IF-808/826 board, the sync signal that is separated from the input reference video signal is phase-compared (PLL) with the internal reference signal (HD, VD) so that frequency of the crystal oscillator in the MB-919 is controlled. From the phase-locked oscillator, the Timing Generator IC generates the internally required timing signals (HD, VD, FRAME, CF, AUDIO ID and others). Because this system does not have the phase-locking loop with external subcarrier signal, these timing signals are not sync with the subcarrier signal of the composite output. The output signal is used as the sync signal of the analog component signal. These signals and clocks are sent to the respective circuit boards.
The reference signal (SV REF.) for the servo system is generated also by the Timing Gen. block of the MB-919 board.

9-1-5. Audio Signal Processing System

1. Betacam SX Playback System (DPR-172/174 Board, IF-808/826 Board)

The playback audio data that is ECC-decoded by the outer ECC Decode block of the DPR-172/174 board receives the signal processing such as digital delay, parity check and others in the Audio Process block. The processed audio data is sent to the IF-808/826 board as the monitor output signal and as the SDI output signal (IF-826 board only).
The serial audio data for the monitor output receives the D/A-conversion, de-emphasis processing and MIX control at the IF-808/826 board, and is output from the MONITOR OUTPUT connector on the connector panel.
On the other hand, the serial audio data for the SDI output is converted to the SDI audio signal and is multiplexed with the video data at the SDI Encode block on the IF-826 board. After multiplexing, the serial audio data is converted from parallel-to-serial and is output from the SDI OUTPUT connector of the connector panel as the SDI signal.

2. MPEG IMX Playback System (DPR-174 Board, IF-808/826 Board)

Among the playback audio signals of CH1 to CH8 that are ECC-decoded (to 8 bits) by the Outer ECC Decode block of the DPR-174 board, CH1 and CH2 are input to the Audio Process block as they are. Any pair of CH3/4 or CH5/6 or CH7/8 is selected and the selected pair is input to the Audio Process block.
The input signal of the Audio Process block receives the processing such as digital delay, parity check and others, and then sent to the IF-808/826 board as the monitor output signal and the SDI output signal (to the IF-826 board only).
Among the input signals to the IF-826 board, the signals of CH5 to CH8 receive the processing such as digital delay, parity check and others in the Audio Process block of the IF-826 board, and then are assigned to the monitor output and the SDI output.
The serial audio data for the monitor output that is input to the IF-808/826 board, receive D/A conversion, de-emphasis processing and MIX control. After the processing, it is output from the MONITOR OUTPUT connector on the connector panel.
The 8 channels of the serial audio data for the SDI output that are input to the IF-826 board, are converted to the SDI audio signal at the SDI Encode block and are multiplexed with the video data. After that, they are converted from parallel to serial data and are output from the SDI OUTPUT connector on the connector panel.

3. Digital Betacam Playback System (DPR-174 Board, IF-808/826 Board)

The playback audio data that is ECC-decoded (to 10 bits) by the Outer ECC Decode block on the DPR-174 board, receives the processing such as digital delay, parity check and others in the Audio Process block, and is sent to the IF-808/826 board as the monitor output signal and the SDI output signal (IF-826 board only).
The serial audio data for the monitor output that is input to the IF-808/826 board, receive D/A conversion, de-emphasis processing and MIX control. After the processing, it is output from the MONITOR OUTPUT connector on the connector panel.
The 4 channels of the serial audio data for the SDI output that are input to the IF-826 board, are converted to the SDI audio signal at the SDI Encode block and are multiplexed with the video data. After that, they are converted from parallel to serial data and are output from the SDI OUTPUT connector on the connector panel.

4. Analog Betacam Playback System (AT Head, IF-808/826 Board)

The longitudinal audio (LAU CH1, CH2) playback signal that is reproduced by the AT head is sent to the IF-808/826 board, passes through the playback equalizer circuit and playback amplifier, and then receives the DOLBY NR processing at the Dolby C Noise Reduction block. Then the audio signal is output from the MONITOR OUTPUT connector of the connector panel as the CH1 and CH2 analog Betacam playback audio signal.
In the IF-826 board, the audio playback signal that receives the Dolby NR processing and is pressed through the Emphasis circuit (Emphasis is turned ON/OFF by setting), is A/D-converted for SDI output and sent to the Audio Process block. In the Audio Process block, the audio signal is converted to the SDI audio signal at the SDI Encode block and is multiplexed with the video data. After multiplexing, the audio data is converted to parallel-to-serial and is output from the SDI OUTPUT connector of the connector panel as the SDI signal.

Note

The AFM track of the analog Betacam (Betacam SP format) cannot be played back by this unit.

5. Analog Output System (IF-808/826 Board, HP-107 Board)

The HEADPHONES output audio signal is sent to the HP-107 board where the headphones level is controlled and is output from the HEADPHONES connector on the control panel. The HEADPHONES level is controlled by the LEVEL control on the control panel.
There are two MONITOR output systems that are the XLR connectors (L, R) and the pin-connectors (MIX). The MONITOR output level can be controlled by the LEVEL volume control on the control panel depending on the setting. (For details, refer to “Expansion Menu” ITEM-144: AUDIO MONITOR OUTPUT LEVEL of the operation manual.)

6. Digital Output System (IF-826 Board only)

The IF-826 board has the SDI output channel. The SDI output level cannot be controlled by the LEVEL volume control on the control panel.

9-1-6. System Control System and Servo Systems

The system control and the servo control are performed in the MB-919 board. The MB-919 board contains the main controller that has the built-in CPU, and the EQ MPU for the system control and the servo control.
The input clock signal to the main controller is 40 MHz that is doubled of its frequency by the built-in frequency doubler so that the operation clock of the servo control system is 80 MHz.
The DR-432 board contains the various driver circuits, the CTL/TC head amplifier and various sensors.

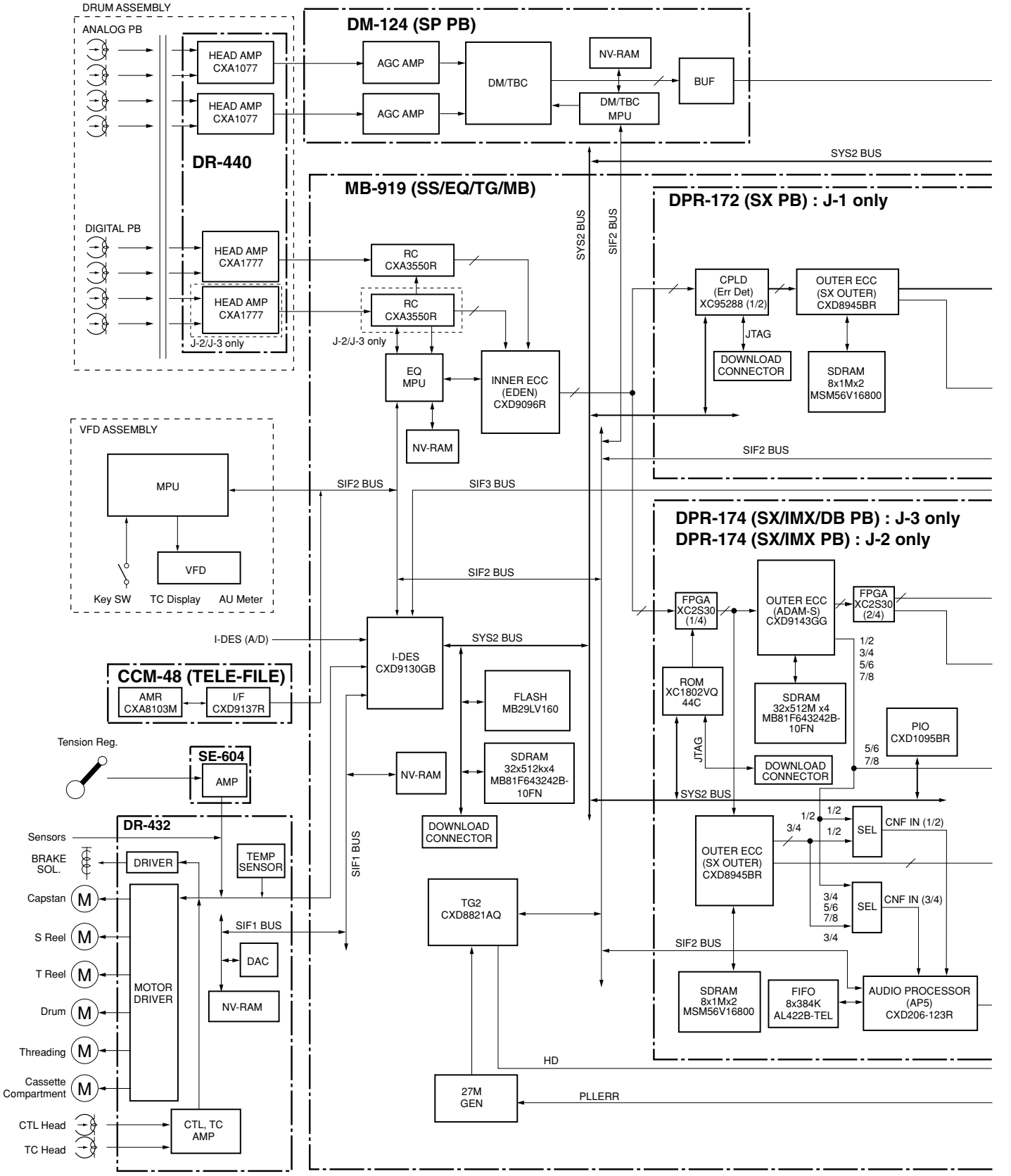
System Control

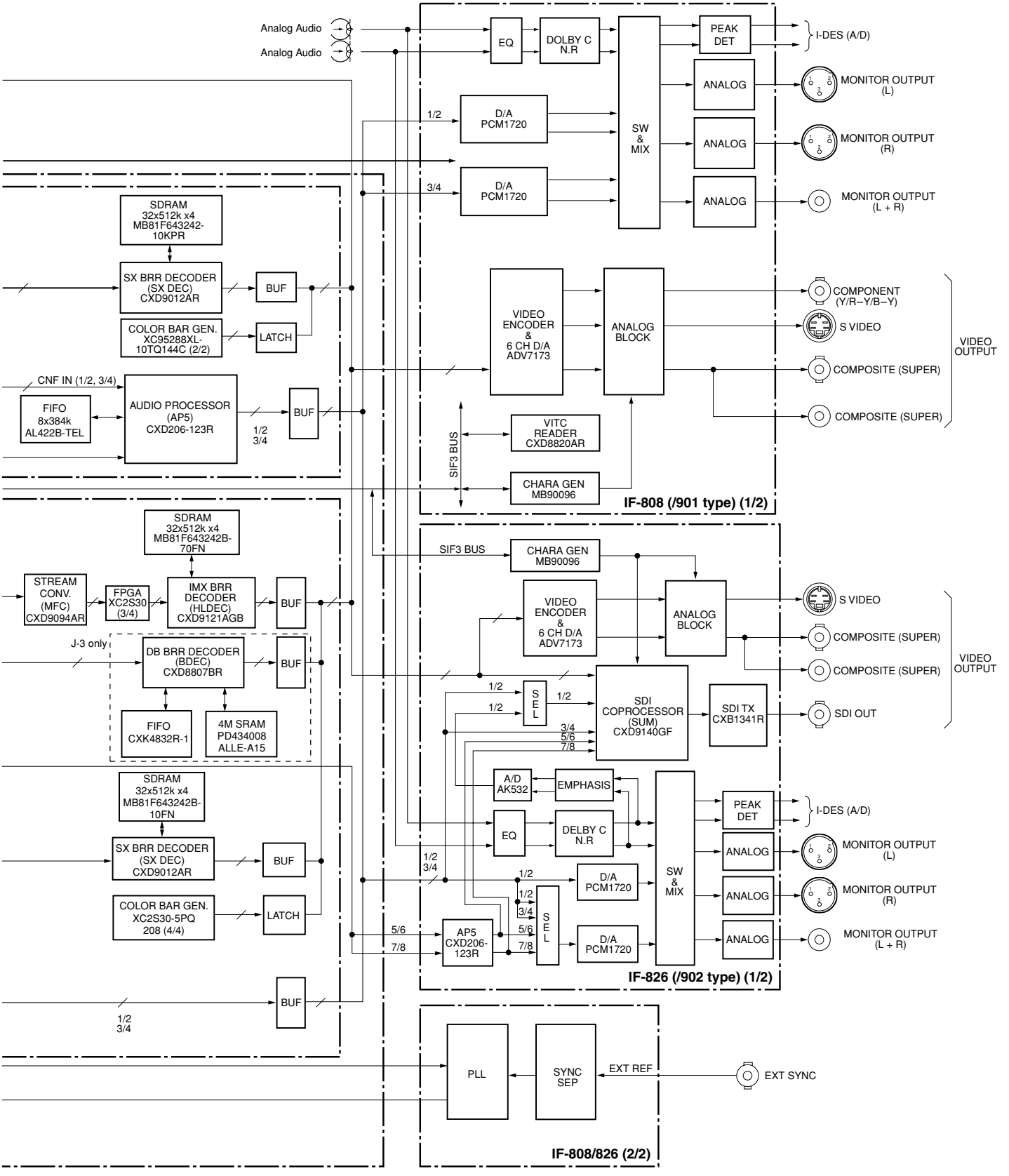
- Remote interface [REMOTE (9P), RS-232C] processing
- Communication processing with the KY MPU (fluorescent display tube assembly: I/F MPU for the JOG-dial/SHUTTLE-ring and the control panel)
- Communication processing with the EQ MPU.
- Character superimposition control.
- Control of the LSI, DSP and PIO on the DPR-172/174 board, IF-808 board and IF-826 board.
- Communication processing with the MPU on the DM-124 board.
- TC (time code) processing

Servo Control

- Control of the various motor drivers (capstan, reel, drum, cassette compartment, threading)
- Detection of the various FG signals, PG signals and various sensors' statuses.
- Generation of the various mode signals and timing pulses in accordance with the tape running condition.

9-2. Overall


DRUM ASSEMBLY
ANALOG PB
HEAD AMP CXA1077
HEAD AMP CXA1077
DR-440
DIGITAL PB
HEAD AMP CXA1777
HEAD AMP CXA1777
J-2/J-3 only
DM-124 (SP PB)
AGC AMP
AGC AMP
DM/TBC
NV-RAM
DM/TBC MPU
BUF
SYS2 BUS
MB-919 (SS/EQ/TG/MB)
SYS2 BUS
SIF2 BUS
DPR-172 (SX PB) : J-1 only
RC CXA3550R
RC CXA3550R
J-2/J-3 only
EQ MPU
INNER ECC (EDEN) CXD9096R
NV-RAM
CPLD (Err Det) XC95288 (1/2)
OUTER ECC (SX OUTER) CXD8945BR
JTAG
DOWNLOAD CONNECTOR
SDRAM 8x1Mx2 MSM56V16800
SIF2 BUS
VFD ASSEMBLY
MPU
VFD
Key SW
TC Display
AU Meter
SIF2 BUS
SIF3 BUS
DPR-174 (SX/IMX/DB PB) : J-3 only
DPR-174 (SX/IMX PB) : J-2 only
SIF2 BUS
I-DES (A/D)
I-DES CXD9130GB
SYS2 BUS
FPGA XC2S30 (1/4)
OUTER ECC (ADAM-S) CXD9143GG
FPGA XC2S30 (2/4)
1/2
3/4
5/6
7/8
CCM-48 (TELE-FILE)
AMR CXA8103M
I/F CXD9137R
FLASH MB29LV160
ROM XC1802VQ 44C
SDRAM 32x512M x4 MB81F643242B-10FN
PIO CXD1095BR
5/6
7/8
Tension Reg.
SE-604
AMP
NV-RAM
SDRAM 32x512kx4 MB81F643242B-10FN
JTAG
DOWNLOAD CONNECTOR
SYS2 BUS
DR-432
Sensors
BRAKE SOL.
DRIVER
TEMP SENSOR
SIF1 BUS
DOWNLOAD CONNECTOR
1/2
3/4
1/2
SEL
CNF IN (1/2)
OUTER ECC (SX OUTER) CXD8945BR
Capstan
S Reel
T Reel
Drum
Threading
Cassette Compartment
MOTOR DRIVER
TG2 CXD8821AQ
3/4
5/6
7/8
SEL
CNF IN (3/4)
3/4
SIF1 BUS
DAC
NV-RAM
SIF2 BUS
SDRAM 8x1Mx2 MSM56V16800
FIFO 8x384K AL422B-TEL
AUDIO PROCESSOR (AP5) CXD206-123R
HD
27M GEN
PLLERR
CTL Head
TC Head
CTL, TC AMP


Analog Audio
Analog Audio
EQ
DOLBY C N.R
PEAK DET
I-DES (A/D)
ANALOG
MONITOR OUTPUT (L)
1/2
D/A PCM1720
SW & MIX
ANALOG
MONITOR OUTPUT (R)
3/4
D/A PCM1720
ANALOG
MONITOR OUTPUT (L + R)
SDRAM 32x512k x4 MB81F643242-10KPR
SX BRR DECODER (SX DEC) CXD9012AR
BUF
COLOR BAR GEN. XC95288XL-10TQ144C (2/2)
LATCH
VIDEO ENCODER & 6 CH D/A ADV7173
ANALOG BLOCK
COMPONENT (Y/R–Y/B–Y)
S VIDEO
COMPOSITE (SUPER)
VIDEO OUTPUT
CNF IN (1/2, 3/4)
FIFO 8x384k AL422B-TEL
AUDIO PROCESSOR (AP5) CXD206-123R
BUF
1/2
3/4
COMPOSITE (SUPER)
SIF3 BUS
VITC READER CXD8820AR
CHARA GEN MB90096
IF-808 (/901 type) (1/2)
SDRAM 32x512k x4 MB81F643242B-70FN
SIF3 BUS
CHARA GEN MB90096
STREAM CONV. (MFC) CXD9094AR
FPGA XC2S30 (3/4)
IMX BRR DECODER (HLDEC) CXD9121AGB
BUF
VIDEO ENCODER & 6 CH D/A ADV7173
ANALOG BLOCK
S VIDEO
COMPOSITE (SUPER)
COMPOSITE (SUPER)
VIDEO OUTPUT
J-3 only
DB BRR DECODER (BDEC) CXD8807BR
BUF
1/2
1/2
SEL
1/2
SDI COPROCESSOR (SUM) CXD9140GF
SDI TX CXB1341R
SDI OUT
3/4
5/6
7/8
FIFO CXK4832R-1
4M SRAM PD434008 ALLE-A15
A/D AK532
EMPHASIS
SDRAM 32x512k x4 MB81F643242B-10FN
EQ
DELBY C N.R
PEAK DET
I-DES (A/D)
ANALOG
MONITOR OUTPUT (L)
SX BRR DECODER (SX DEC) CXD9012AR
BUF
1/2
3/4
1/2
D/A PCM1720
SW & MIX
ANALOG
MONITOR OUTPUT (R)
COLOR BAR GEN. XC2S30-5PQ 208 (4/4)
LATCH
1/2
3/4
SEL
5/6
7/8
AP5 CXD206-123R
5/6
7/8
D/A PCM1720
ANALOG
MONITOR OUTPUT (L + R)
BUF
1/2
3/4
IF-826 (/902 type) (1/2)
PLL
SYNC SEP
EXT REF
EXT SYNC
IF-808/826 (2/2)

Appendix A
Setting Check Sheet

Keep a note of the settings (switch settings and so forth) of the unit by filling in the attached “Setting Check Sheet”. Make photocopies of the check sheet so that you can fill in the data of each unit. These records of the various settings will help you return the unit to its original settings in case the settings are changed due. (Use the “Setting Check Sheet” to avoid setting the unit incorrectly.)

Model name : _____ Serial No. : _____

- Hard ware ☐ /901 type (with Analog component video output)
  ☐ /902 type (with SDI output)

- Firmware
  SS ROM version : _____

- Hours meter reading
  Fill in the hours meter reading during inspection, maintenance and repair.

ITEM	Date	Hours meter
H01 : OPERATION HOURS	/	
H02 : DRUM RUNNING HOURS	/	
H03 : TAPE RUNNING HOURS	/	
H04 : THREADING COUNTER	/	
H06 : REEL SHIFT COUNTER	/	
H12 : DRUM RUNNING HOURS (Resettable)	/	
H13 : TAPE RUNNING HOURS (Resettable)	/	
H14 : THREADING COUNTER (Resettable)	/	
H16 : REEL SHIFT COUNTER (Resettable)	/	

On-board switches

Note

Never change the setting of the on-board switches that are marked “Factory use”.

Board	Switch	No. :	Name	Factory setting	Setting by customer	
DM-124	S1701	1 :	Y MUTING	OFF	□ OFF	□ ON
		2 - 3 :	Factory use	OFF	■ OFF	
		4 :	C MUTING	OFF	□ OFF	□ ON
		5 :	COMB	OFF	□ OFF	□ ON
		6 - 8 :	Factory use	OFF	■ OFF	
	S1801	1 :	Factory use	OFF	■ OFF	
		2 :	IMP OFF	OFF	■ OFF	□ ON (During adjustment only)
		3 :	Factory use	OFF	■ OFF	
		4 :	Not used	OFF	■ OFF	
		5 :	AGC OFF	OFF	■ OFF	□ ON (During adjustment only)
		6 :	DO ADJ	OFF	■ OFF	□ ON (During adjustment only)
		7, 8	Not used	OFF	■ OFF	
IF-808/826	S101		L/R channel monitor output level setting switch	+4 dBm	□ +4 dBm □ 0 dBm □ −3 dBm	
	S201		CH 1 HEAD TUNE switch	To be set during adjustment	–	
	S202		CH 2 HEAD TUNE switch	To be set during adjustment	–	
	S501		Adjustment mode switch	3 (left)	■ 3 (left)	□ 2 (During adjustment only)
MB-919	S1600	1, 2 :	Not used	OFF	■ OFF	
		3 - 8 :	Factory use	OFF	■ OFF	

Setup Menu Settings in 525 System

The setup menu stores the data of the 525 system and that of the 625 system independently.
These two systems are switched by using ITEM-013: 525/625 SYSTEM SELECT. (Refer to “Basic Menu” of the Operation Manual.) Select the respective systems and fill the data in the “Setting Check Sheet”.

525 system : From page A-3 to page A-4
625 system : From page A-5 to page A-6

The check sheet items may be modified or added in future versions; use the space outside the columns on the check sheet.

Note

If bank 1 or 2 is called, the current menu is overwritten.
Therefore, be sure to make a note of the current menu in the “Setting Check Sheet”. Then make a note of banks 1 and 2.

Basic Menu

ITEM-000 series : Items related to operations

ITEM		Factory setting	Current setting	Bank 1	Bank 2
002 :	CHARACTER H-POSITION	04			
003 :	CHARACTER V-POSITION	10			
005 :	DISPLAY INFORMATION SELECT	OFF			
007 :	TAPE TIMER DISPLAY	+−12H			
009 :	CHARACTER TYPE	WHITE			
011 :	CHARACTER V-SIZE	× 1			
012 :	CONDITION DISPLAY ON VIDEO MONITOR	disable			
013*1 :	525/625 SYSTEM SELECT	OFF	–	–	–
020 :	DROP-FRAME MODE SELECT	DF			
021 :	PF1 KEY SELECT	FORMAT			
022 :	PF2 KEY SELECT	REM			
099 :	MENU GRADE	BASIC			

*1 : ITEM-013 is not related with the bank.

ITEM-B00 series : Items that are related to menu banks

The ITEM-B00 series settings need not be recorded.
The ITEM-B00 series settings are set to OFF normally. The items are set to ON only when the ITEM is executed.
When execution of the ITEM is completed, the settings are returned to OFF automatically.

Expansion Menu

ITEM-100 series : Items related to operation panel

ITEM		Factory setting	Current setting	Bank 1	Bank 2
101 :	SELECTION FOR JOG/SHUTTLE DIAL ENABLE	DIAL			
102 :	MAXIMUM TAPE SPEED	MAX			
104 :	AUDIO MUTING TIME	LOCK			
105 :	REFERENCE SYSTEM ALARM	OFF			
114 :	AUDIO MONITOR OUTPUT LEVEL	FIXED			
125 :	AUTO REWIND	ENA			
130 :	TIMER DISPLAY DIMMER CONTROL	3			

ITEM-500 series : Items related to tape protection

ITEM		Factory setting	Current setting	Bank 1	Bank 2
501 :	STILL TIMER	8M			

ITEM-700 series : Items related to video signal control

ITEM		Factory setting	Current setting	Bank 1	Bank 2
710 :	INTERNAL VIDEO SIGNAL GENERATOR	OFF			
713 :	VIDEO SETUP REFERENCE LEVEL	0.0 %			
715 :	VIDEO GAIN CONTROL	20H			
716 :	CHROMA GAIN CONTROL	20H			
717 :	CHROMA PHASE CONTROL	80H			
718 :	SETUP LEVEL	0H			
719 :	SYSTEM PHASE SYNC	3FH			
721 :	Y/C DELAY	800H			

ITEM-800 series: Items related to audio signal control

ITEM		Factory setting	Current setting	Bank 1	Bank 2
802 :	DIGITAL AUDIO MUTE IN SHUTTLE MODE	OFF			
808 :	INTERNAL AUDIO SIGNAL GENERATOR	OFF			

Setup Menu Settings in 625 System

The setup menu stores the data of the 525 system and that of the 625 system independently.
These two systems are switched by using ITEM-013 : 525/625 SYSTEM SELECT. (Refer to “Basic Menu” of the Operation Manual.) Select the respective systems and fill the data in the “Setting Check Sheet”.

525 system : From page A-3 to page A-4
625 system : From page A-5 to page A-6

The check sheet items may be modified or added in future versions; use the space outside the columns on the check sheet.

Note

If bank 1 or 2 is called, the current menu is overwritten.
Therefore, be sure to make a note of the current menu in the “Setting Check Sheet”. Then make a note of banks 1 and 2.

Basic Menu

ITEM-000 series : Items related to operations

ITEM		Factory setting	Current setting	Bank 1	Bank 2
002 :	CHARACTER H-POSITION	04			
003 :	CHARACTER V-POSITION	12			
005 :	DISPLAY INFORMATION SELECT	OFF			
007 :	TAPE TIMER DISPLAY	+−12H			
009 :	CHARACTER TYPE	WHITE			
011 :	CHARACTER V-SIZE	× 1			
012 :	CONDITION DISPLAY ON VIDEO MONITOR	disale			
013*1 :	525/625 SYSTEM SELECT	OFF	–	–	–
021 :	PF1 KEY SELECT	FORMAT			
022 :	PF2 KEY SELCT	REM			
099 :	MENU GRADE	BASIC			

*1 : ITEM-013 is not related with the bank.

ITEM-B00 series : Items that are related to menu banks

The ITEM-B00 series settings need not be recorded.
The ITEM-B00 series settings are set to OFF normally. The items are set to ON only when the ITEM is executed.
When execution of the ITEM is completed, the settings are returned to OFF automatically.

Expansion Menu

ITEM-100 series : Items related to operation panel

ITEM		Factory setting	Current setting	Bank 1	Bank 2
101 :	SELECTION FOR JOG/SHUTTLE DIAL ENABLE	DIAL			
102 :	MAXIMUM TAPE SPEED	MAX			
104 :	AUDIO MUTING TIME	LOCK			
105 :	REFERENCE SYSTEM ALARM	OFF			
114 :	AUDIO MONITOR OUTPUT LEVEL	FIXED			
125 :	AUTO REWIND	ENA			
130 :	TIMER DISPLAY DIMMER CONTROL	3			

ITEM-500 series : Items related to tape protection

ITEM		Factory setting	Current setting	Bank 1	Bank 2
501 :	STILL TIMER	8M			

ITEM-700 series : Items related to video signal control

ITEM		Factory setting	Current setting	Bank 1	Bank 2
710 :	INTERNAL VIDEO SINGAL GENERATOR	OFF			
715 :	VIDEO GAIN CONTROL	20H			
716 :	CHROMA GAIN CONTROL	20H			
717 :	CHROMA PHASE CONTROL	80H			
718 :	BLACK LEVEL	0H			
719 :	SYSTEM PHASE SYNC	3FH			
721 :	Y/C DELAY	800H			

ITEM-800 series : Items related to audio signal control

ITEM		Factory setting	Current setting	Bank 1	Bank 2
802 :	DIGITAL AUDIO MUTE IN SHUTTLE MODE	OFF			
808 :	INTERNAL AUDIO SINGAL GENERATOR	OFF			

For Customers in the U.S.A. and Canada

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, “metallized” knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 3.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers’ instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The “limit” indication is 5.25 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 20 V AC range are suitable. (See Fig. A)

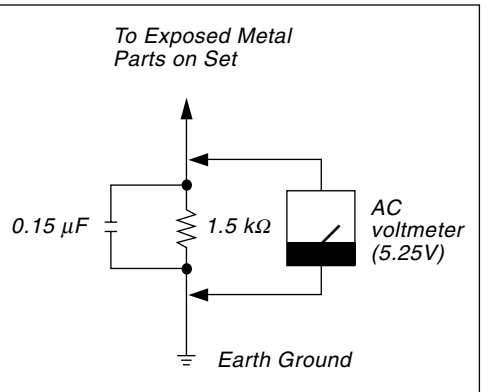


Fig A. Using an AC voltmeter to check AC leakage.

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